

MOTOR AGE

National Racing Stage Set at Elgin



SCENE DURING PRACTICE

CHICAGO, Aug. 23.—For the second time the Chicago Motor Club and the Elgin Automobile Road Race Association are about to demonstrate their ability to successfully conduct the national stock chassis road races of the American Automobile Association—four in all and each designed to bring out a champion in a particular class. The meet takes place Friday and Saturday and the program of last year will be repeated. The cars of the 301-450 class will run for the Illinois cup at 202 miles on Friday along with the other two divisions, the 231-300 class for the Kane County cup at 169 miles, and the 161-230 class for the Aurora cup at 135 miles. On Saturday the cars of under 600 cubic inches piston displacement will run for the famous Elgin National trophy, a perpetual challenge cup which last year was won by Mulford in the Lozier. The big race will be at 305 miles and will be the only event on Saturday.

The closing of the entries Saturday night left thirty-five names in the box, one more than last year, with twelve in the Elgin National, four in the Illinois, sixteen in the Kane County and only three in the Aurora. These thirty-five, though, are a most representative lot, including sixteen makes—Lozier, Alco, National, Simplex, Pope-Hartford, Mercer, Velie, Staver-Chicago, Cole Corbin, Colbin, Colby, Cino, Falcar, Ford and Abbott-Detroit. All of these are almost certain to go to the post with the exception of the Falcar, nothing



ELGIN NATIONAL AND AURORA TROPHIES

ON THE ELGIN COURSE

having been heard from that company regarding its racing plans since the receiver was appointed. As the cars are not at Elgin and a representative of the company was not present at the drawing Monday, it is concluded that the Falcar will not line up with the others in the Kane County.

The dozen cars in the Elgin National promise an exciting race, for the cars themselves are fast and the drivers are some of the best in the country, including Mulford, Grant, de Palma, Wishart, Aitken, Zengel, Buck, Lee, Hartman, Hughes, Raimey, Barnes and Burt. In the Illinois only two Velies and two Nationals will run, but the battle ought to be spirited at that. The Kane County has the largest field and there it looks like almost anyone's race. The Aurora cup just did fill and in order to make it a race A. M. Robbins, the local agent, had to put in a second Abbott-Detroit to run against the Ford, which Frank Kulick will drive.

So far as it is possible to arrange things all details have been attended to. The course, the critics say, is at least 5 miles an hour faster than last year. It ought to be, for \$6,000 has been spent on the homestretch alone. All the turns have been widened and the only possible criticism is found in a few thank-ye-ma'ams in the backstretch which are noticeable when traveling at high speed. The homestretch almost is like a boulevard, espe-



Elgin National Trophy, Distance, 305 Miles, for Stock Chassis 600 Cubic Inches and Under

No.	Car	Driver	Model Year	No. Cyl.	Bore	Stroke	Piston Displacement	S. A. E. H. P.	Type of Cyl.	Lubrication	Pump	Ignition	Clutch
1	Alco.....	Harry Grant	1909	6	4 $\frac{1}{2}$	5 $\frac{1}{2}$	579	54.1	T	Crankcase Circulating	Centrifugal	Bosch Single	Multiple Disk Cone
2	National.....	Len Zengel.....	1911	4	5	5 $\frac{1}{2}$	447	40	T	Crankcase Circulating	Centrifugal	Splitdorf Two-point	Cone
3	Pope-Hartford..	Dave Buck	1911	4	4 $\frac{1}{2}$	5 $\frac{1}{2}$	390	36.1	Overhead Valves	Mechanical	Centrifugal	Splitdorf Double	Cone
4	Simplex.....	Spencer Wishart.....	1912	4	5 $\frac{1}{2}$	5 $\frac{1}{2}$	597	53	T	Mechanical	Centrifugal	Bosch Two-point	Multiple Disk
5	Alco.....	Frank Lee	1911	6	4 $\frac{1}{2}$	5 $\frac{1}{2}$	579	54.1	T	Crankcase Circulating	Centrifugal	Bosch Two-point	Multiple Disk
6	National.....	John Aitken	1911	4	5	5 $\frac{1}{2}$	447	40	T	Crankcase Circulating	Centrifugal	Splitdorf Two-point	Cone
7	Alco.....	Harry Hartman.....	1911	6	4 $\frac{1}{2}$	5 $\frac{1}{2}$	579	54.1	T	Crankcase Circulating	Centrifugal	Bosch Two-point	Multiple Disk Cone
8	Cino.....	John Raimy	1911	4	4 $\frac{1}{2}$	5	300.6	30.625	Valve in head	Mechanical	Centrifugal	Remy Two-point	Cone
9	Mercer.....	H. Hughes.....	1911	4	4 $\frac{1}{2}$	5	300.6	30.625	T	Crankcase Circulating	Centrifugal	Bosch Double	Multiple Disk Cone
10	Cino.....	Andy Burt.....	1911	4	4 $\frac{1}{2}$	5	300.6	30.625	Valve in head	Mechanical	Centrifugal	Remy Two-point	Cone
11	Simplex.....	Ralph De Palma	1912	4	5 $\frac{1}{2}$	5 $\frac{1}{2}$	597	35	T	Mechanical	Centrifugal	Bosch Two-point	Multiple Disk
12	Losier.....	Ralph Mulford.....	1911	4	5 $\frac{1}{2}$	6	544	46	T	Mechanical	Centrifugal	Bosch Two-point	Multiple Disk

Illinois Trophy, Distance, 202 Miles, for Stock Chassis, 301-450 Cubic Inches

1	National	Don Herr.....	1911	4	5	5 $\frac{1}{2}$	447	40	T	Crankcase Circulating	Centrifugal	Splitdorf Two-point	Cone
2	Velie	R. Jeffkins.....	1912	4	4 $\frac{1}{2}$	5 $\frac{1}{2}$	341	32.4	L	Crankcase Circulating	Centrifugal	Remy Dual	Multiple Disk Cone
3	National	Charles Merz	1911	4	5	5 $\frac{1}{2}$	447	40	T	Crankcase Circulating	Centrifugal	Splitdorf Two-point	Cone
4	Velie	J. H. Stickney	1912	4	4 $\frac{1}{2}$	5 $\frac{1}{2}$	341	32.4	L	Crankcase Circulating	Centrifugal	Remy Dual	Multiple Disk

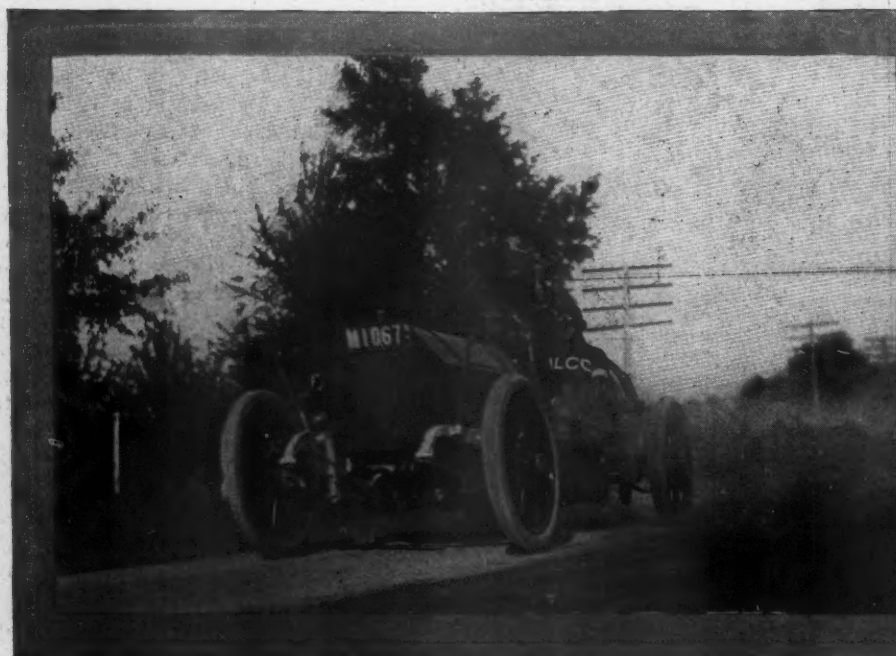
cially that section between Hornbeck's turn to Britten's hill, just west of the grandstand, a 1-mile strip which is 54 feet in width, extending from fence to fence and seemingly capable of 90 miles an hour. Udina turn now is 80 feet wide.

Races Start at 11 O'Clock

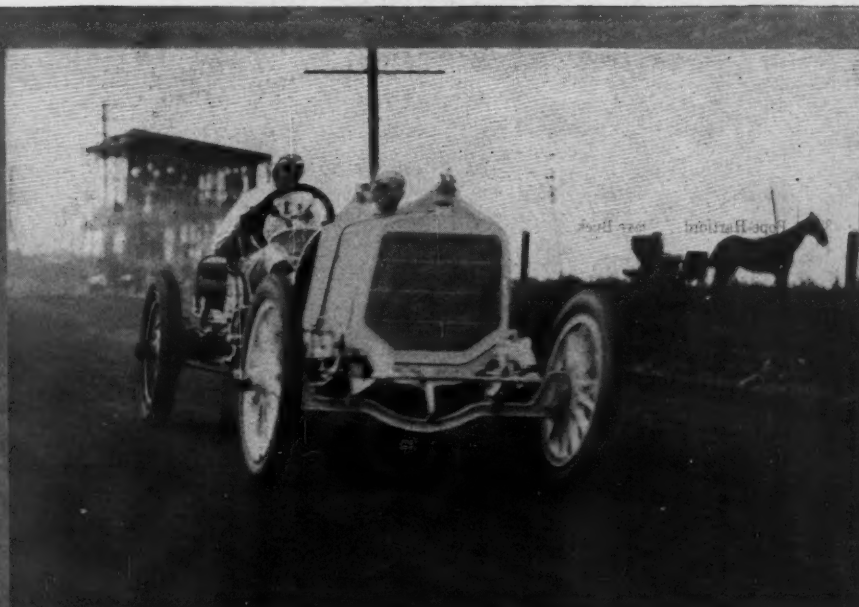
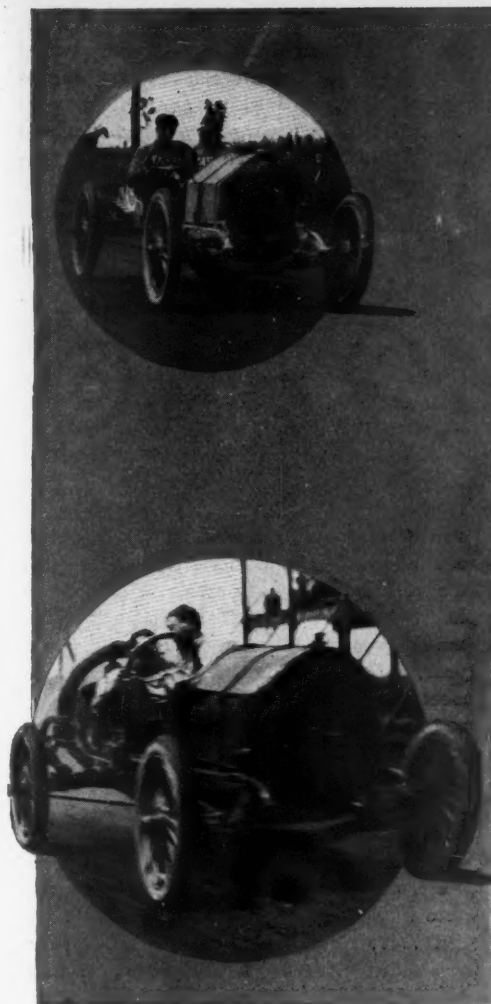
The races themselves will start at 11 o'clock each day instead of at 10 as was the case last year and the course will not be closed until 10:40 a. m., which ought to increase the attendance, for the main difficulty in the past has been to get the spectators seated in time. Most of them

dislike the idea of having to go out to Elgin the night before and the idea of getting a start from Chicago at 5 a. m. is displeasing to the majority. Now, with all the transportation arrangements that have been made, it will be possible to leave this city as late as 8:30 and still get to the course in time. Those who will motor out will also have the trip made easy for them through the foresight of the Chicago Motor Club and the Elginites who have contributed a purse of \$1,600, which was spent in putting calcium chloride on the road between the city limits and Elgin,

rendering it dustless. At the same time it is hoped that this will be an object les-



GRANT IN ALCO ON BACK STRETCH—AITKEN IN NATIONAL AND MAISONVILLE IN CORBIN



MONCKMEIER, STAVER; JENKINS, COLE; MULFORD, LOZIER

son for other towns and that the ultimate result will be that the country roads in this vicinity will be oiled or made dustless otherwise.

In the way of grandstands and other structures at the the tape, the Elgin association has not spared time or money. The grandstand is the same one that was used in the recent aviation meet or rather a section of it. It will be put up tomorrow and will be capable of seating 6,600. The boxes this year, 120 of them, will be placed at the top of the stand and will be covered. From this point of vantage it is possible to see the cars race down the backstretch. There are parking spaces aplenty, there being room for 20,000 cars around the course if that many should go out. The rates are reasonable, in keeping

with the Chicago Motor Club policy, only \$2 being charged for parking spaces and \$1 for grandstand seats. In addition there is a general admission fee of 50 cents which must be paid by everybody. The whole affair is a co-operative scheme, the property owners sharing in the profits.

Big Prize List

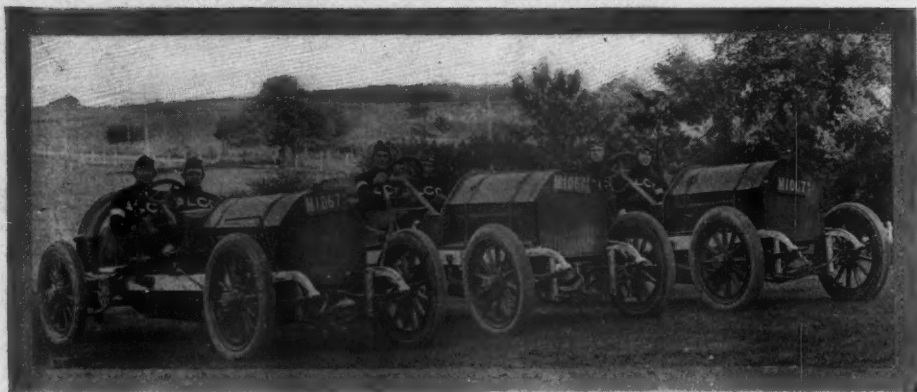
The prize list is a particularly good one this year and the winner has a chance to pull down a good purse. The cash prizes offered by the Elgin Automobile Road Race Association total \$2,500; of which amount the winner of the Elgin national gets \$1,000, with \$300 for second and \$200

Kane County Trophy, Distance 169 Miles, for Stock Chassis, 231-300 Class

No.	Car	Driver	Model Year	No. Cyl.	Bore	Stroke	Piston Displacement	S. A. E. H. P.	Type of Cyl.	Lubrication	Pump	Ignition	Clutch
11	Cino.....	Andy Burt.....	1911	4	4½	5	300.7	30.625	Valve in head	Mechanical	Centrifugal	Remy Two-point	Cone
12	Mercer.....	W. F. Barnes, Jr.....	1911	4	4½	5	300.7	30.625	T	Crankcase Circulating	Centrifugal	Bosch Double	Multiple Disk
14	Corbin.....	A. Maisonville.....	1909	4	4½	4½							
15	Mercer.....	H. Hughes.....	1911	4	4½	5	300.7	30.625	T	Crankcase Circulating	Centrifugal	Bosch Double	Multiple Disk
16	Staver-Chicago	J. Nikrent.....	1912	4	4½	5	300.7	30.625	T	Automatic Splash	Centrifugal		Multiple Disk
17	Falcar.....												
18	Colby.....	H. W. Ogren.....	1912	4	4½	5½	297	28.9	L	Crankcase Circulating	Centrifugal		Cone
19	Falcar.....												
20	Colby.....	W. H. Pearce.....	1912	4	4½	5½	297	28.9	L	Crankcase Circulating	Centrifugal		Cone
21	Cole.....	G. Morris.....	1911	4	4½	4½	286	32.4	L	Splash	Centrifugal		Cone
22	Colby.....	M. Armstrong.....	1912	4	4½	5½	297	28.9	L	Crankcase Circulating	Centrifugal		Cone
23	Falcar.....												
24	Cole.....	J. Jenkins.....	1911	4	4½	4½	286	32.4	L	Splash	Centrifugal		Cone
25	Staver-Chicago	Fred Robillard.....	1912	4	4½	5	300.7	30.625	T	Automatic Splash	Centrifugal		Multiple Disk
26	Cino.....	John Raimsey.....	1911	4	4½	5	300.7	30.625	Valve in Head	Mechanical	Centrifugal	Remy Two-point	Cone
27	Staver-Chicago	G. Monckmeier.....	1912	4	4½	5	300.7	30.625	T	Automatic Splash	Centrifugal		Multiple Disk

Aurora Cup, Distance, 135 Miles, for Stock Chassis, 161-230 Class

31	Abbott-Detroit	A. M. Robbins.....	1911	4	4	4½	213	25.6	L	Circulating Splash	Centrifugal		Multiple Disk
32	Ford.....	Frank Kulick.....	1911	4	3½	4	176	22.5	L	Circulating Splash	Thermo-Siphon	Ford Magneto	Multiple Disk
33	Abbott-Detroit	Mortimer Roberts.....	1911	4	4	4½	213	25.6	L	Circulating Splash	Centrifugal		Multiple Disk



ALCO CAMP ON McCORMICK FARM

for third. In the Illinois the winner receives \$400 and in both the Kane County and the Aurora the first prize is \$300. In addition there are trophies in each race, the Elgin National alone being valued at around \$4,000. The Illinois cup is given by the Elgin Automobile Road Race Association, the Kane County by the Kelly hotel of Elgin and the Aurora cup by the Aurora Automobile Club.

Bonuses given by makers of accessories are most liberal this year. The Stromberg Motor Devices Co., of Chicago, offers cash prizes for the fastest laps, regardless of equipment, \$200 being hung up in the big race and \$100 in each of the others. In addition \$1,200 is offered for victories where Stromberg carbureters are used. The Findeisen & Kropf Mfg. Co., of Chicago, maker of the Rayfield carbureter, hangs up \$800 for users of its device, \$500 being the offering in the big race and \$100 in each of the others. The Remy Electric Co., maker of the Remy magneto, is splitting \$1,200 among three of the races as an encouragement to users of its magnetos. The Dorian rim people also have contributed \$500 and the Sears & Cross speedometer makers offer \$200. In all the prize list totals in the neighborhood of \$15,000.

The military arrangements are complete and for the third time Chicago will have the use of the troops. At Crown Point 2 years ago the Chicago Automobile Club accomplished the seemingly impossible by taking an Illinois regiment, the First, into Indiana; last year the Chicago Motor Club had the Eighth Illinois at Elgin, while this year 200 men from the Third Illinois will guard the course the first day, while on the second day the First Illinois Cavalry, a Chicago troop, will be on the job, dismounted, of course. Colonel Milton J. Foreman commands the cavalry.

Fast Time in Practice

Practice for the races started last Friday, according to schedule, but on that day not many took advantage of the opportunity. Only eleven came out and the time was far from being sensational. Grant in the Alco was the star performer and his best performance did not give anyone an inkling of the phenomenal speed that was to be shown the following day. Grant made the circuit in 8:02, at the rate

of a little better than 60 miles an hour. Johnny Aitken in the National swung around in 8:11, while Barnes and Hughes in the Mercer, Jeffkins and Stickney in Velies, Lee and Grant in the Alcos and Buck in the Pope-Hartford were others who tried out the course. No one seemed to want to open up and the hour that was allowed for fast work was spent in feeling out the circuit.

It was a different story the second day, Saturday. By that time several of the other candidates were out for honors. Mulford appeared for the first time. The three Stavers were on the course and so were Jenkins in the Cole and Herr in the National. The previous day's training had improved the course wonderfully and fast laps were plenty. Mulford started out for two fast laps and the first time around showed the possibilities. He was clocked in 7:13, better than 70 miles an hour, and considerably faster than the 7:52 made by Livingstone in the Illinois last year, which was the fastest lap of the meet. Mulford kept moving and his second lap was only 2 seconds slower. Others participated in the speedfest. Aitken in the National was credited with 7:23 and 7:22; Merz' best time was 7:36; Zengel, another National driver did 7:35 and 7:56; Herr, the fourth man on the blue team, did 7:50 and 7:55; Hartman in the Alco turned 7:55 and 7:58; Grant did 7:42 and 7:47, while Hughes showed the pace of the little Mercer by clocking 7:47 and 7:50.

De Palma and Wishart, who are to drive Simplexes, got to the course Saturday and by hurrying were able to get out in their cars just before practice closed. They only had time for part of a lap before the bomb went up, announcing the conclusion of the work.

Ralph Ireland Killed

Monday was an ill-fated day and the first fatality occurred, Ralph Ireland, driver of one of the Stavers, being so injured in practice that he died a few hours later. Crown Point showed a clean bill of health so far as accidents were con-

JEFFKINS, VELIE DRIVER
BARNES IN THE MERCER

RALPH DE PALMA AT WHEEL OF SIMPLEX

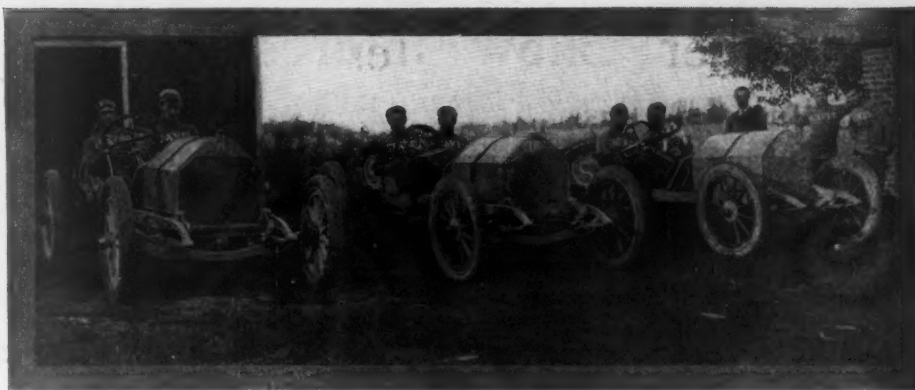
cerned, while last year the only mishap at Elgin involved Fritsch in the Cino, who ran into a wire fence and was somewhat cut up. Ireland's accident was a peculiar one and it is declared that the course was not responsible for it. Ireland was in the homestretch at the time and on a strip of road that was as smooth as a floor. He had just swung a slight bend in front of the Alco camp and seemingly his speed caused him to overshoot the road enough to carry him onto the grass. There was no ditch at the point and the strip of grass was far from being rough.

It is declared that as the Staver swung onto the grass a rear wheel gave way. Ireland ran on the grass for a ways and had he stayed there he probably would not have been injured. But with his broken wheel he tried to turn back onto the road again and climbing the slight crown caused him to upset. The driver was caught under the car, and evidently the brace that was used to brace the steering column prevented him from freeing his feet. It was this brace that caused most of Ireland's injuries, it is said. O'Brien, the mechanic, was bruised somewhat, but not seriously hurt.

Hughes and other drivers stopped and pulled the Staver off Ireland and he was hurried to a hospital at Elgin, where he died at 4:30. The accident put a stop to practice for the day after less than an hour's work. The time made was not as fast as on Saturday. Grant opened the throttle a bit for a 7:43, while Wishart showed a bit of Simplex speed for the first time, being clocked in 7:41. His teammate, de Palma, was content with a slower lap, his best time being 7:52. Aitken was recorded in 7:48, Hughes in 7:45 and Hartman in 7:43.

Practice Tuesday and today was more spirited. Yesterday Mulford did a lap in 7:10, the fastest ever made on the course, and today he did 7:18, with Aitken having 7:19.

Because of the curtailment of the time for practice, it has been decided to give the speed merchants another opportunity



STAVES TEAM IN CAMP AT ELGIN

THE LATE RALPH IRELAND
DAVE BUCK, POPE DRIVER

SPENCER WISHART, WHO WILL DRIVE SIMPLEX IN BIG RACE

on Thursday which originally had been set aside for fixing up the course. There will be a meeting of the drivers, at which time instructions will be given by the referee and starter. At the same time the Chicago Motor Club will introduce an innovation—that of having a physician examine each driver as to his physical condition. This work will be done by Dr. E. T. Olsen, physician for the civil service board of the city of Chicago. Also there will be representatives of the Motor Racing Drivers' Association who will pass upon the competency of the pilots who have been nominated and if any of them are deemed poor drivers they will not be permitted to start.

Banquet Tendered Mulford

As a break in the training the Chicago Motor Club last night tendered a banquet to the racing drivers, with Ralph Mulford as the guest of honor, in view of his victory last year. The affair was held at the Lexington hotel and attracted about 100. Not many of the drivers came in, for all are observing strict training rules and it is early to bed with them. However, Mulford, Buck, Pearce, Armstrong and Ogren were there, and in addition, Eddie Hearne, one of last year's winners, was at the guest table.

The occasion was the presentation to the Lozier company of the \$500 gold medal which the Elgin Watch Co., donor of the big trophy, gives to each year's winner upon his relinquishing the cup. The medal was duly presented to C. A. Emise, representing the Lozier company, and he in turn handed it over to Ralph Mulford with the compliments of the company—not that the Lozier company does not appreciate the gift from the Elgin Watch Co., but because its officers believe Mulford is entitled to it for his 1910 work.

There were speakers galore, whose flow of eloquence was gently tapped by Toastmaster F. L. Estey. Harry Houpt, manager of the Alco racing team, spoke on "Lifting Cups" and made a humorous talk. Mulford himself was billed for "Joy Riding" and made a hit with his definition of the term. Mr. Emise talked gracefully on "Strictly Stock," in which he praised the Chicago Motor Club for its support of stock car contests.

September Show Interests Detroit

Comprehensive Display of Cars Will Be Made At State Fair—Already Many Exhibitors Have Been Booked—Hupp Company Issues Statement Regarding Changes—Rushing Production

DETROIT, MICH., Aug. 21—Detroit motordom is looking forward with great interest to what is likely to be the first comprehensive display of 1912 motor cars to be held anywhere in the United States. Reference is, of course, made to the annual show, which takes place in the building particularly constructed for the purpose on the grounds of the Michigan state fair. Of course, the dates are coincident with those of the fair—September 18-22.

Every foot of space in motor hall has been taken and the larger number of the Detroit factories will exhibit, either directly or through their Michigan distributors. In addition, most of the manufacturers of motor cars whose factories are in Michigan, though outside of Detroit, will be on hand.

Concerns Going in Show

Among the exhibitors will be representatives of the Jackson, Cole, Studebaker Corporation, Rapid, Brush, Poss, Hupmobile, Detroit Motor Wagon Co., Chalmers, Commerce Motor Car Co., Elmore, Hudson, Day Utility, Lion, General Motors, Abbott-Detroit, Cartecar, Regal, Oakland, Everitt, Cadillac, Buick, Overland, Detroit electric, United Motors, Seitz, Mitchell-Lewis and many others. In each case the exhibitors promise to make displays of the complete lines for the coming year. In many cases the cars will be shown for the first time.

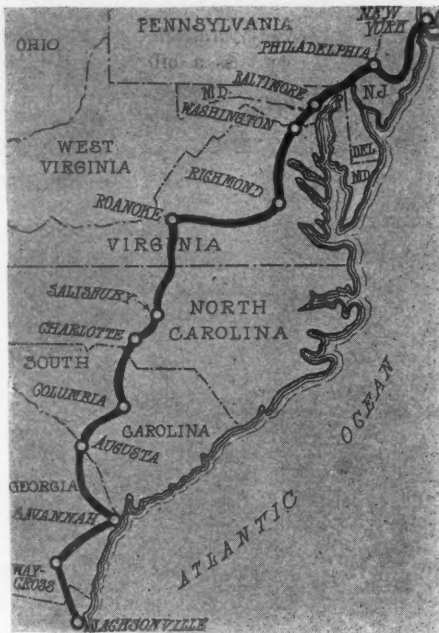
The fair's motor show has come to be one of its most attractive features and in addition to the motor-wise who come to get their first view at the new designs there is a large attendance of prospective purchasers who come to make their choice at a place where they have free access to practically all the latest types.

The show has a separate management which, though under the general control of the Fair association, acts independently in conducting the display. Walter Wilmot is the show manager.

Statement by Hupp Company.

Following the sale of his Hupmobile stock by R. C. Hupp, the Hupp Motor Co. has issued the following announcement:

"Charles D. Hastings has been appointed general manager of the Hupp Motor Car Co., to succeed R. C. Hupp, who has resigned, to devote his entire attention to other interests. Mr. Hastings has been with the Hupp Motor Car Co. as assistant general manager since its inception and has always been prominently identified in the executive affairs of this company, so that the retirement of Mr. Hupp will in no way affect the plans or policy of the Hupp Motor Car Co.



THE GLIDDEN TOUR ROUTE

"Mr. Hastings has been identified with the motor industry since its infancy, having been connected with the Olds Motor Car Co. before the Hupmobile came into the market.

"E. A. Nelson, the designer and chief engineer of the Hupp Motor Car Co., to whom is due the credit of the design and motor of the Hupmobile, is at the head of the engineering department, and the personnel of the officials of the company remains unchanged with the exception of Mr. Hupp's retirement.

"The Hupp Motor Car Co. is interested only in the manufacture of the Hupmobile and has no connection with any other companies."

Rushing 1912 Production

Production of 1911 models is in progress at all plants in Detroit at present and, while the rush of getting out demonstrators for the dealers is now over and there is very little night work, general activity is in progress to a much more noticeable extent than a year ago. The Packard is steadily increasing its force and is working at a rate in excess of anything in its history. The firm will shortly come into the possession of additional floor space which will raise its producing area to 37 acres. At present the plant employs 7,000 men and is the largest purchaser of labor in the local field. The firm is now about 2 weeks behind orders and is working its machine shop at night.

The deserted plant where the ill-starred Anhut six was made has been occupied during the past week by the Poss Motor

Co., the first car of which participated in the recent truck run between Detroit and Chicago. It is announced that the firm will produce 1,200 light delivery trucks during the coming year, with a load capacity of from 1,200 to 1,500 pounds.

The Poss is one of the few new concerns to enter the lists this season and, like nearly all of its generation, is a producer of commercial rather than pleasure vehicles. A number of new manufacturing concerns have been recently formed to produce parts and equipment, however. Among these are the Auto Lock and Specialty Co. of Detroit, capitalized at \$35,000; the Durable Top Specialty Co. of Detroit, \$15,000; and the Mason Motor Co. of Flint, \$100,000.

HUPP MAKES ANNOUNCEMENT

Detroit, Mich., Aug. 22—At a dinner Monday evening, given by the Hupp Corporation to its department heads and branch managers, President R. C. Hupp announced that the firm has made arrangements to manufacture and market a new gasoline driven motor car to be known as the R. C. H. The present model is a runabout, with enclosed body, long-stroke motor and a large percentage of high grade steels. It is of light, carefully selected materials and will sell at a low price, the purchase figure including complete equipment. Other models of the same chassis are to be designed and brought out as rapidly as possible. A special factory building on the site owned by the Hupp Corporation is to be built shortly, it is understood. More than thirty-five of Mr. Hupp's aides sat down at the dinner, the list including the following: Branch managers, J.W. McRea, Detroit; L. A. Root, Minneapolis; E. H. Stimson, Philadelphia; E. D. Haupt, Cleveland; C. H. Batchelor, Chicago; J. O. Harris, Los Angeles; C. F. Christian, Kansas City; R. W. McMullen, Buffalo, and E. W. Swanbrough, Denver. Prior to the banquet the branch managers had been the guests of Mr. Hupp and Sales Manager Harwood Bacon at the plant of the corporation, where the Hupp-Yeats electric and other products of the company are manufactured.

EARLY GLIDDEN ENTRIES

New York, Aug. 21—Already entries are coming for the Glidden tour, which is to run from New York city to Jacksonville, Fla., in October. It is to be run under grade 4, which requires no technical examination and which carries with it no technical penalties. This, therefore, lets in cars which are not registered as stock with the A. A. A. So far the entries are as follows:

Robert P. Hooper, president A. A. A., Philadelphia, Garford; New York team No. 1, consisting of three Maxwells, entered by the United States Motor Co.; Atlanta team No. 1, consisting of Edwin P. Ansley, Pierce-Arrow, C. H. Johnson, Stevens-Duryea, and B. M. Grant, Marmon; Herbert-B.

Race, Cole, Jacksonville, Fla.; O. S. Albritton, Cadillac, Jacksonville, Fla.; W. J. Hillman, Cadillac, Live Oak, Fla.; Ray M. Owen, New York, two Reos. It is expected there will be more entries materialize next week.

Enthusiasm in South

Atlanta, Ga., August—If northern and eastern motorists enter the Glidden of 1912 with anything like the enthusiasm that southerners are, it will be the largest tour ever recorded. Hardly had entry blanks reached Dixie before they began to flow back to A. A. A. headquarters in great numbers. B. M. Grant, of Atlanta, former motor enthusiast and Marmon driver, was the first to enter from the south and others followed rapidly. Among the notables already entered are H. M. Atkinson, of Atlanta, president of the Atlanta, Birmingham and Atlantic railway; Major Jack Cohen, promoter of the southern end of several New York to Atlanta runs, and Mayor C. S. Wynn, of Atlanta, who will drive a Flanders. Another certain entry will be Asa Candler, Jr., president of the Atlanta Automobile Association, with his Lozier, and who will represent Atlanta.

Work on the national highway has been redoubled and there is no chance to doubt but that it will get more special preparatory work than any other road ever did for a Glidden event. Also, if there is not too much rain, which there isn't likely to be at that time in the fall, the entire course will be in good condition and easy sailing for the tourists.

Plans are now being made to charter a Clyde Line steamer to take the cars to New York. This will mean a big saving in transportation charges.

GENERAL MOTORS' NEW VENTURE

Detroit, Mich., Aug. 23—The General Motors announces its intention to manufacture a line of electric trucks of from 1 to 6 tons capacity at the Pontiac plant, under directions of John M. Lansden, formerly of the Lansden Co. of Newark, N. J. The product will be sold by General Motors Truck Co., a separate selling organization to handle all General Motors' commercial vehicles.

New Ideas Are Found In a Federal Bill

Congressman Linthicum Would Have Government Appoint Highway Commission—Seeks to Make Uniform Laws of Various States as to Speed Limits and Suggests Federal Car Licenses

WASHINGTON, D. C., Aug. 16—Representative Linthicum of Maryland introduced in congress a bill providing for a federal highways commission to cooperate with the several states in the construction, improvement and maintenance of highways throughout the United States and also to maintain a bureau for the federal registration of motor cars and the licensing of operators. The bill calls for an appropriation of \$25,000,000 for the work of the commission for the first 3 years. Representative Linthicum was the author of the motor laws of Maryland and the present bill if made a law will do much toward making the motor laws of the various states more uniform and reasonable.

The main features of the bill, which has been referred to the committee on interstate and foreign commerce, are as follows: A federal highways commission to consist of three members, two of whom are to be appointed by the president and the third to be an officer of the engineer corps of the United States army. The duties of this commission are to conduct investigations and experiments to determine the best methods of road-making and to publish bulletins on the comparative cost and durability of materials and their adaptability to different sections; to bring about a uniform system of improvement repair and maintenance of the public highways throughout the United States; to fix and exact a federal license governing interstate motor car travel and commerce.

By the provisions of the bill the federal government, through the highway commission, will supervise the construction and improvement of roads and pay one-half of the necessary expense, the state to pay the other half and keep the roads in repair for 10 years. The commission may provide road working machinery and tools but all the laborers not only are to be United States

citizens but are to be residents of the state in which the work is done. There are to be no grade crossings with railroads or electric roads, the government to pay one-half and the railroad the other half of the cost of any elevation or lowering of tracks required to do away with grade crossings. A uniform system of signboarding is provided for by making it necessary to have the roads thoroughly signboarded with signs of uniform designs, size and color, carrying the names and distances of towns and the marking of danger spots; also any historic points are to be marked with tablets bearing a short notice and description of the place.

The laws of the various states bearing on motor car traffic are made uniform by refusal of aid to states whose laws do not conform to certain set specifications as to speed limit and rules of the road, the limits being so devised so as to make the laws more reasonable than they are at present in many states. Also the state must amend its laws to conform to the provisions of federal registration and licensing of motor cars and operators. The federal registration of motor cars requires a yearly fee of \$25 and a car so registered need not be registered with the state, but the state is to receive one-half of the federal registration license fee. The federal license plate is to be a metal shield bearing the letters U.S. in addition to the registration number and the year, and is also to be of different color for each year. A car bearing this number plate may run in any state without additional fees or permits.

COMMER FINISHES RUN

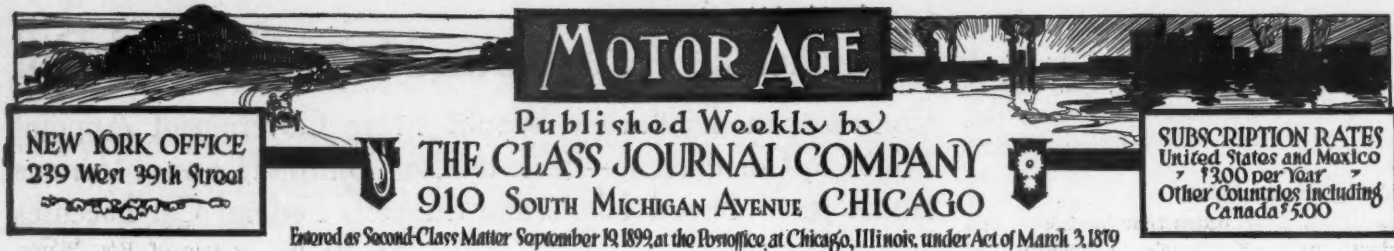
New York, Aug. 22—The 3½-ton Commer truck with which Wyckoff, Church & Partridge of New York have been visiting the cities and towns of the north central states recently arrived in New York. The trip started at Chicago and included the important cities of Michigan, Illinois, Indiana, Ohio, Pennsylvania and New York states. The total distance traveled was 2,536 miles. The Commer truck's total lubricating oil consumption was 63 pints, making the average of 40½ miles per pint of oil. The gasoline consumption was 354¼ gallons.

BAKER GETS FEDERAL CONTRACT

Washington, D. C., Aug. 23—Public Printer Donnelly today awarded the Baker Motor Vehicle Co. the contract for furnishing the government printing office with six electric trucks. The contract price was \$17,373. The trucks will replace eighteen horses and seven wagons in the service of the public printer.



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Stock Car Contests and Their Value

ACCORDING to the present rules of the American Automobile Association two kinds of contests are deemed necessary for the benefit of the motor industry, the first being the stock car contest and the second one the non-stock contest. The object of the stock car contest is to give the maker the best possible chance of demonstrating to the public exactly what his car will do; in a word, it is a public demonstration of his car, so far as speed and reliability are concerned. On the other hand, the non-stock contest was designed as an experimental field for the car builder. The engineering departments of the factories have not sufficient opportunity to try out their new ideas in a satisfactory manner and the non-stock, or class C division of the 1911 contest rules, gives an excellent chance for this. When these rules were first formulated it was expected that the following non-stock events would not be nearly so great as in the stock car events. Time has proven otherwise. The non-stock fields have been the bigger. One major reason for this has been the enormous purses offered to the winning drivers in non-stock events. So great has this influence been that not a few factories have been under the dictation of the drivers.

NON-STOCK contests are excellent as an experimental field, but does the maker have to spend a whole year in experimental work? Is it necessary to do all experimental work and very little proving, after the product has been adopted? Experimental work is most essential to the engineering departments. If the engineer is undecided as to the relative merits of the long-stroke motor, it gives him an opportunity to build a motor of any relative bore and stroke and test it out thoroughly on the road. This is all right, provided the rest of the design is of his regular stock construction: To explain: A maker builds a motor with stroke one-half in excess of the bore and tries it out in a class C race. His stock motor is a T-head design, but for this special one he builds a valve-in-the-head type. He does not even dream of building a valve-in-the-head type for regular stock. What is the result? A lot of misleading information. His special motor gives a lot of extra power and he immediately gives the credit to the long stroke. He decides to use the same stroke-bore ratio in his stock model for the next season. The next season he builds his long-stroke motor with T-head cylinders and long stroke. It does not give the expected power. Why? The valve-in-the-head shows a higher efficiency than the T-head. He has built his experimental car, he has raced his experimental car, he has spent his money and yet has not answered the question he originally set out to answer, namely the relative improvement in his style of motor with a long stroke. The makers should guard against this kind of folly. It will prove too expensive to them. It does not answer what they want to know.

IF A MANUFACTURER wants to test out any particular phase of construction he should adopt that particular construction to his own design and thereby discover what its exact merit is in that relationship. It is one more application of the old Shakespearian quotation, "How many things by season, seasoned are." Two-spark ignition may show wonderful increase in efficiency in a T-head motor, but very little in a

valve-in-the-head type. How absurd it would be for a maker building a valve-in-the-head type, who wants to know the real merits of two-spark ignition, to build a special T-head design and take the results he obtained from such and then look for them in the valve-in-the-head type.

EVERY manufacturer when he enters a contest expects to sell cars as a direct result of the performance of his car in that contest, consequently that contest will be of most value which means most to the public. Which will the public do, will it buy more of a winning car if it is stock, or can be purchased in any salesroom, or if it is a special creation of which it is entirely ignorant? The answer comes from the public and also from the maker. The public is most interested in what it most understands. The owner wants to see what an exact duplicate of his car can do in the hands of the expert. He wants this information as a sort of guiding star. If his particular car will not run at high speeds for successive hours without overheating, he is anxious to know how a similar car will behave in the hands of the skilled driver in a 300-mile race. The spectator, at least, can hope to imitate the driver a moiety in this respect. In this field there is a bond of interest between the stock car performing and every spectator who owns such a car, or expects to own one.

THE MANUFACTURERS' Contest Association is to be congratulated on its stand of recommending a series, of at least a dozen, big stock car events for the coming season of 1912. These are to be scattered over the leading market centers of the country. The maker wants these because they will sell more goods for him than non-stock events will. What interest is it, further than that of a passing spectacle, to watch a car racing which every spectator knows he can not buy, simply because it is not being manufactured for sale and can not possibly be offered for sale for 8 months or 1 year. The stock car event is the big seller. Sales that are a direct result of a car's performance in a contest generally follow closely upon the finish of such a contest. The public forgets quickly unless constantly reminded of the results.

NOT A FEW makers object to the present stock car rules on the ground that they think the competing cars are not strictly stock. This is not the case, at least so far as those points are concerned which are covered in the stock car registration blanks. These blanks contain information on several hundred features of the car; these features are the salient ones in so far as the car is concerned. It is true the present rules do not cover the exact analysis of the metal used in many of the different parts. This would be an impossibility. This criticism, however, answers itself, because when a maker discovers that a certain analysis is not strong enough for steering parts for a race he is certainly not going to retain the poor metal in the stock product, because at one time or another it is going to be put to the extreme test, even with many of the prospective owners. It is the practical tests that count, those tests, the results of which can be incorporated into the regular stock model and these results have up to the present been best obtained by the stock car contest.

Bay State Counts the Motor Tourists

BOSTON, Mass., Aug. 21—The great increase in inter-state motor traveling is well illustrated in the large number of cars from other states that have been registered under the touring section of the Bay State law this season. Under the law cars may be registered for 3 months at a nominal fee, these being the summer months, and while the season is only about half over nearly 400 out of the state residents have availed themselves of the privilege. That the Massachusetts roads appeal to visiting motorists is shown by the fact that a number of registrations have been made within the past week, and there will be others also registered, although they will not have the full 3 months to run as the expiration comes at the end of September. The registrations are becoming so popular that there will be an effort made next year to change the law to make it 3 months from date of registration instead of restricting it to the 3 summer months solely.

The astonishing part of it all is that so many cars are registering, when as a matter of fact it would be possible to go in and out of the state several times and no one would know whether a car was entitled to the 10 days privilege or not without making an investigation. And when so many are registered it means that ten times as many cars pass through the Bay State without being placed on the registration list. It shows that the investment in good roads is a paying proposition because the motorists leave a lot of money behind them.

There are thirty-one states and the District of Columbia represented on the rolls. New York leads all others by a large margin, with 121 cars registered. New Jersey and Pennsylvania are close rivals, the former with thirty-five and the latter having thirty-four representatives. Ohio has the surprising number of twenty-eight, while Missouri has twenty-seven. Illinois and Connecticut have fifteen each. Rhode Island has 12. Washington and Indiana have nine each, and Michigan eight. Other states on the list are Arkansas, one; Alabama, three; Delaware, one; Florida, two; Iowa, two; Kentucky, eleven; Louisiana, two; Maryland, six; Minnesota, three; Maine, one; Nebraska, one; New Hampshire, two; North Carolina, two; South Carolina, one; Tennessee, three; Texas, three; Virginia, one; Vermont, one; Wisconsin, one; Washington, one.

This list shows that the motorists came from north, south and west and the only reason they did not come from the east is due to the fact that the Bay State is bounded on that side by the Atlantic ocean. There was one car from Canada, and another evidence of the popularity of motoring is shown by the registration of a car by the commander of a battleship

Great Increase in Interstate Traveling Noted in Massachusetts—New York Sends 121 Visitors in 3-Month Stretch



*August 25-26—Elgin road races, Chicago Motor Club.
 October 9—Oklahoma Reliability run, Daily Oklahoman.
 September 2-4—Brighton Beach races, New York.
 September 2-4—Track racing at Amarillo, Texas.
 September 2—Truck meet, Columbus, O.
 September 2-12—Motor truck display, Milwaukee Industrial Exposition.
 September 3-4-5—Social tour of E-M-F and Flanders owners, Indianapolis to Chicago.
 September 6-9—Reliability run of Automobile Club of Buffalo.
 September 7-8—Philadelphia track meet, Philadelphia Automobile Trade Association.
 September 7-8-9—Track meet, Minnesota State Automobile Association, Hamline track, Minnesota.
 September 7-10—Reliability run of Buffalo Automobile Club.
 September 9—Hill climb at Port Jefferson, N. Y.
 September 10—Liedekerke cup road race, Belgium.
 September 12-13—Track meet, State Automobile Association, Grand Rapids, Mich.
 September 15—Track meet, Appalachian exposition, Knoxville, Tenn.
 September 16—Track meet, Automobile Club and Dealers, Syracuse, N. Y.
 September 18-20—Reliability run for trucks of Chicago Motor Club, Chicago.
 September 19-21-23—Reliability run, Burlington, Vt.
 October 3-7—Track meet, Danbury, Conn., Agricultural Society.
 October 6-13—Eight-day reliability run of Chicago Motor Club.
 October 7—Fairmount Park road race, Philadelphia.
 October 14—Santa Monica road races, Los Angeles, Cal.
 October 15-25—Glidden tour, New York to Jacksonville.
 October 16-18—Reliability run of Harrisburg Motor Club.
 November 1—Track meet of Waco Automobile Club, Waco, Tex.
 November 2-3-4—Reliability run of Quaker City Motor Club, Philadelphia.
 November 9-11—Track meet, San Antonio Automobile Club.
 November 4-6—Phoenix road race, Maricopa Automobile Club.
 November 9—Track meet of Maricopa Automobile Club, Phoenix, Ariz.
 November 27—Vanderbilt road race, Savannah, Ga.
 November 30—Grand prix race, Savannah, Ga.
 January 6-20—Madison Square Garden show, New York City, Automobile Board of Trade.
 March 13-20—Show of Boston Commercial Motor Vehicle Dealers' Association, Mechanics' building, Boston.
 January 1-7—Grand Central palace show of Automobile Manufacturers of America, New York City.
 January 10-17—N. A. A. M. show in Grand Central Palace, New York.
 January 27-February 10—N. A. A. M. show in Chicago.

*Sanction already issued



being held at the Charlestown navy yard.

More than fifty different makes of cars are represented on the list. And of the total registrations more than 25 per cent comprise the famous trio of P's, Pierce-Arrow, Peerless and Packard. To be exact, there are 118 of these three. The list also shows that there are a larger number of motorists making tours now in the small cars from long distances, an evidence that the small cars can stand up and that their owners are not afraid to trust themselves in them far away from home. The big cars have a good representation, among them being the Locomobile, Stevens-Duryea, Lozier, Stearns, Marmon, White, Rambler, Winton, Columbia, Mitchell, Franklin Stoddard Dayton, and Studebaker. The leader of the lower priced cars is the Cadillac with twenty-five to its credit. Chalmers comes next with fifteen and Buick has thirteen. Ford, Maxwell, Overland, E-M-F, Brush, Hudson, Regal, Overland, Reo, Velie and Hupmobile are others on the list.

There were several motor parties which came through from the Pacific coast, one party of four making the trip from Los Angeles to Moosehead Lake, Me., in 20 days in a Pierce-Arrow. A Winton party motored from Seattle, Wash., and a Chalmers party came from Salt Lake City. As all of them motored back home again it means that scores of motorists now make trips each summer of 5,000 miles and upwards. This is excellent proof of the serviceability of the modern machines and a great tribute to the genius of the designers of American cars and the progress of the American industry.

FAIRMOUNT BLANKS OUT

Philadelphia, Pa., Aug. 19—The Quaker City Motor Club sent out entry blanks on Friday afternoon for the Fairmount park 200-mile road race to be held over the 8-mile west park course at noon on Saturday, October 7. The placing of the management of this annual eastern classic under the control of the Quaker City Motor Club ends a controversy that has been waging off and on for a period of several months among the Quaker City Motor Club, Mayor Reyburn and the Philadelphia Automobile Trades Association, the last named organization, composed of dealers in gasoline pleasure cars, having some time ago put in an application for the honor of conducting the event. As in last year's race, cars will be classified in four divisions: 4-C, 231 to 300 cubic inches piston displacement; 4-C, 301 to 450; 5-C, 451 to 600, and 6-C, 601 to 750; cars in each of the divisions to compete for division prizes of \$1,000 each, in addition to the grand prize of \$2,500 for the making the best time. Entries are limited this year to thirty cars.

Trucks of All Sizes Make Good Showing

CHICAGO, Aug. 20—The 9-day reliability run for the commercial vehicles, which was promoted by the Chicago Evening American, ended at the starting point in Chicago on Thursday. The route was from Chicago to Detroit, with night stops at South Bend, Fort Wayne, Lima and Toledo; and back by way of Jackson, Kalamazoo and South Bend. The distance covered was 756 miles, with the vehicles running at an average schedule speed of from 8 to 14 miles per hour.

Of the twenty-six vehicles that started in the run, twenty-five finished and twenty-four checked in at the finish on time, only one having fallen out on the fourth day as a result of engine trouble. Six out of the twenty-five to finish had perfect scores at the end of the run; but only one of these managed to survive the final technical examinations.

A two-cylinder Buick delivery wagon with a load of 1,500 pounds and driven by F. W. Kunze, was the only perfect-score car at the end of the final technical examinations. The six cars, however, that managed to finish with a perfect road score included: Two Buicks, Hewitt, Nelson, LeMoon, Federal and Mais.

All of the above cars, however, are not winners. In deciding the winners of the tour the cost of operation per ton mile has been the chief determining factor, while

Lincoln, Buick, Nelson Le Moon, Federal, Mais, Kelly and Two Gramms Are Declared Class Winners After a Gruelling Grind of 756 Miles Through Indiana and Michigan

the road penalties and those of the final technical examination have been but a minor consideration; it will be found, however, in some instances, that the latter assumed the greater proportions in the final score.

As is shown in an accompanying table, the cup winners in the respective classes are as follows: Class 2K, No. 24 Lincoln; class 3K, No. 10 Buick; class 4K, No. 23 Nelson LeMoon; class 5K, No. 32 Federal; class 6K, No. 2 Gramm; class 7K, No. 13 Mais; class 8K, No. 17 Kelly, and class 9K, No. 4 Gramm.

The cars were run in classes or divisions according to their carryin capacities and arranged as per the following:

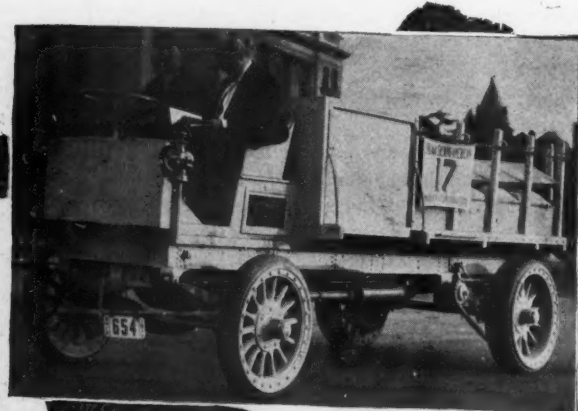
1K, up to 500 pounds; 2K, from 501 to 1,000 pounds; 3K, from 1,001 to 1,500 pounds; 4K, from 1,501 to 2,000 pounds; 5K, from 2,001 to 3,000 pounds; 6K, from 3,001 to 4,000 pounds; 7K, from 4,001 to 5,000 pounds; 8K, from 5,001 to 7,000 pounds; 9K, from 7,001 to 10,000 pounds; 10K, from 10,001 to 15,000 pounds; 11K, from 15,001 to 20,000 pounds, 12K, over 20,000 pounds.

In promoting this contest, it was the ob-

ject not only to emphasize the superiority of the motor over the horse-drawn vehicle, but also to demonstrate to the purchaser of commercial vehicles the cost of their operation. An accurate record of all the gasoline and oil used by each vehicle throughout the run was kept by the technical committee, as well as an account of all repairs and adjustments made; and these factors, together with a certain stipulated sum or percentage for tire cost per mile, up-keep cost and chassis depreciation per annum, have been used to determine the winner of the contest. These figures are shown in the table shown herewith.

In figuring the cost of operation the following was used: Driver's wages, divisions 1-K to 4-K inclusive, per day, \$4.50; drivers' wages, divisions 5K to 7K inclusive, per day, \$3.33; drivers' wages, division 6K, per day, \$4.17; gasoline consumed at 12 cents per gallon; lubricating oil consumed at 25 cents per gallon; depreciation at 12 per cent per annum on chassis value, without tires, allowing 300 working days.

Tire cost at the following schedule: Up



WINNERS IN CLASSES OF CHICAGO-DETROIT TRUCK RUN—UPPER LEFT, BUICK. LOWER LEFT, GRAMM. UPPER RIGHT, KELLEY. LOWER RIGHT, NELSON LE MOON

In Chicago to Detroit and Return Run

Figures on Cost of Operation Greatly Exaggerated Because of Bad Roads and Heavy Sand, Conditions Which Are Not Ordinarily Encountered in Motor Trucking in This Country

to 500 pounds capacity, per mile, $\frac{1}{2}$ cent solid, $2\frac{1}{2}$ cents pneumatic; 1,000 pounds capacity, 1 cent solid, 3 cents pneumatic; 1 ton capacity, 2 cents solid, $3\frac{1}{2}$ cents pneumatic; 2 ton capacity, 3 cents solid; 3 ton capacity, 4 cents solid; solid; 4 ton capacity, 5 cents solid; 5 ton capacity, 6 cents solid. All intermediate weights were figured on the next weight above; for instance, 1,500 pounds was figured on the 1-ton rate.

In the respective divisions during demonstrations the following average speeds were maintained:

Division 1-2K, pneumatic 14, solid 12 miles per hour; division 2-4K, pneumatic 12, solid 10 miles per hour; division 5-6K, pneumatic 10, solid 9 miles per hour; division 7-12K, solid 8 miles per hour.

This is the first demonstration of its kind in which a conscientious effort has been made to give the purchaser of motor vehicles an idea of the actual service possible from a certain make of vehicle, together with the probable cost of such service. In the data collected during this demonstration

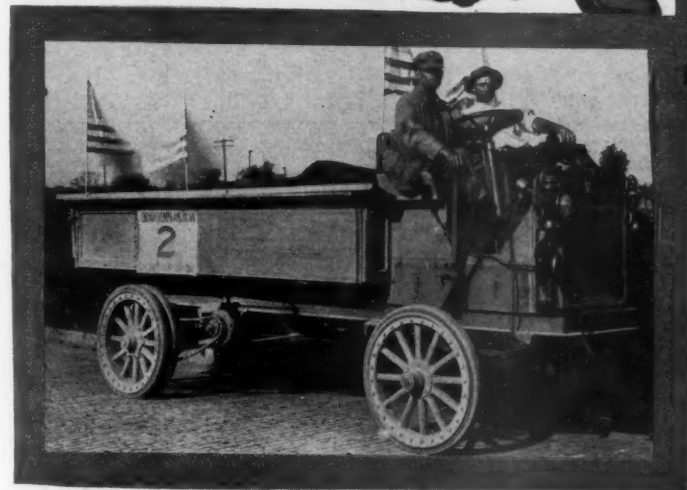
there is much, perhaps, that is not to be taken too seriously, because the constants, or percentage used to decide the winners are of an arbitrary nature. As yet there is no data at hand on which an absolutely fair percentage of chassis depreciation and tire cost can be based; nor can the reliability of a commercial vehicle be fairly demonstrated in a run of but 756, 1,000 or even 2,000 miles. Depreciation hardly begins until a vehicle has been run a couple of thousand miles and then it is not in direct proportion to the mileage, but in an ever increasing ratio. This rotation, too, is affected to a very great extent by the character of the tires employed. It would hardly be fair to figure the chassis depreciation of a solid-tired vehicle at the same percentage or ratio as that of a pneumatic-tired vehicle. A solid-tired vehicle may show a much greater economy than a pneumatic-tired one, but the wear and tear on the solid-tired vehicle will be very much greater as far as its mechanical chassis construction is concerned.

In this demonstration each of the vehicles was loaded to its catalogued capacity. In

all $36\frac{1}{2}$ tons were transported 756 miles on 2,243 gallons of gasoline and 148 gallons of lubricating oil at an average cost of 78 cents per ton mile, including the percentage of tire cost, driver's wages and depreciation or wear and tear on the chassis.

One great error was made in the laying out of this tour that affected the final results obtained to a considerable extent. For 2 days the cars were driven through a territory where the roads were in terrible shape and the conditions were anything but those for which the commercial car is designed. No one would ever consider the use of a commercial vehicle in a country where the roads were impassible, and during these 2 days all of the larger vehicles in the run were subjected to strains that never would be encountered in any regular service in which a motor vehicle would be practicable. Had it not been for the severe conditions encountered during these 2 days, a much better fuel and oil economy would have been shown by the heavier vehicles. Many gallons of fuel and oil were consumed by those vehicles during the hours that their engines were being strained and raced while pulling each other out of the deep sandy places that allowed the axles to rest on the roadbed.

As for the weaknesses in design and construction that the run brought out in the



SOME OF THE CLASS WINNERS IN CHICAGO-DETROIT TRUCK CONTEST—UPPER LEFT, LINCOLN—LOWER LEFT, GRAMM 5-TON—UPPER RIGHT, MAIS—LOWER RIGHT, FEDERAL

various contesting vehicles, there were but few, and these for the most part of small importance. The test, however, was a severe one and those vehicles that did have weak points had them very plainly shown up. It therefore was an excellent means of showing the maker where the weak points lay and that there is no doubt but that some of the makers having cars in the run will profit by their experience.

Another important feature was the excessive wear on some of the tire equipment, some of the vehicles having to make several changes, while others of the same weight made no changes and still managed to keep their tires in good shape. The following facts were brought out: Where a car is to be used on country roads where there are ruts with which to contend, the tread of the wheels should be standard and the wheels shod with single and not dual tires. In cases where the tread was wider than standard, it was necessary to drive with the wheels on one side of the car in a rut, while the other wheel would be breaking down the crest on the outside of the other rut, thereby causing excessive power consumption and excessive wear on the one tire and perhaps on both. If dual tires are fitted, and the tread is standard, then both of the outside tires generally are breaking down the crest of the ruts on either side and rapid wearing away of the rubber takes place. As for the effect of the power transmission on the tires nothing startling was brought out.

From Jackson to South Bend

South Bend, Ind., Aug. 16—Except for a bad stretch of road near Decatur, the eighth day's run was uninterrupted. Several of the cars encountered a little trouble on little stretches of bad road, but on the whole the going was quite a relief to the drivers of the larger cars, who were quite worn out from their troubles of the preceding day.

The first thing on the program of several of the large vehicles immediately after checking out was to stop at a sand pit $\frac{1}{2}$ mile up the road and refill their sand bags and replace their loads, the loads having been thrown off by order of the referee on the day previous in order that the cars might negotiate the almost impassable roads between Marshall and Battle Creek.

The roads from Jackson to Battle Creek might have looked pretty good to the path-finding car, which by the way was not a 8-ton truck but a 1-ton touring car, but after three or four of the heavy commercial vehicles of this contest had passed over them they were more like a freshly plowed field than a road.

Near Decatur a detour of about 1 mile was necessary on account of road repairs to the scheduled route. This detour required that a very poor stretch of road through a vineyard be used. Several cars were delayed at this point, but through the co-operation of the drivers in assisting each other all got through without considerable delay.

The No. 3 Gramm truck, whose perfect score had been destroyed on the morning of the seventh day, because of a broken fan support which permitted the fan to cut a hole in the radiator as it broke, encountered the same hard luck in the evening just before checking at the night control. This caused considerable delay in getting started again this morning, and increased the penalties for lateness and repairs 563 points. Being so far behind made the going for this truck most inconvenient, for not only were the roads cut to pieces by the preceding vehicles, but there was no one to help it out of the bad places.

Several of the other cars were penalized. The Van Dyke was charged 118 points for bolting up the mud pan, stopping the motor to cool it and for lateness at control. This

car suffered most of its penalties as a result of overheating caused by a defective water pipe which permitted the water to drain out of the cooling system. The Lauth-Juergens was penalized 62 points for repairing the contact points of the magneto. The Owosso truck, which had sheared the bolts in a universal joint on the seventh day and replaced them with ill-fitting ones, received another penalty for them again today, 24 points being levied upon it for this and for replacing a Woodruff key in a gear-shifting lever. The Gramm received an additional 11 points for replacing a fan belt; Krickworth suffered 1 point for putting back a driving chain which had slipped off its sprocket; the Chicago Pneumatic Tool was penalized 5 points for similar trouble; and No. 33 Chase received 4 points for changing spark plugs.

Finish of the Run

Chicago, Aug. 17—The last day's run from South Bend to Chicago by way of Valparaiso was quite uneventful, except that the Stephenson truck broke its crankshaft while running idle in front of the hotel at Valparaiso, the noon control. An order for another shaft immediately was sent to Milwaukee, the home of the Stephenson; and while waiting for its arrival the broken shaft was disassembled from the engine. The new shaft arrived in due time, was fitted into the engine, and the run of about 50 miles to Chicago made in time to bring the car within the time limit of 12 hours for lateness. A very heavy penalty of 1,978 points for work and lateness was levied for this trouble and an otherwise creditable score was ruined. Gramm No. 3 again had fan trouble, for which 122 points was assessed, this being simply a recurrence of the original trouble for which suitable repairs along the road had not been obtained. Strained rear axles made trouble

FINAL RESULTS OF COMMERCIAL VEHICLE RELIABILITY CONTEST—ROAD AND TECHNICAL PENALTIES ASSESSED AND

No.	CAR	DRIVER	Class	PENALTIES										1st DAY, 94.7 MI.		2d DAY, 77.3 MI.		3d DAY, 63.3 MI.		4th DAY, 82.8 MI.	
				1st Day	2d Day	3d Day	4th Day	5th Day	6th Day	7th Day	8th Day	9th Day	Total Road Penalties	Technical Exam.	Total Penalties	Gas.	Oil	Gas.	Oil.	Gas.	Oil.
9	Poss.	W. F. Trudeau	2-K	142	136	115		Out								5	1.5	7.5	3	5	3.25
24	Lincoln	Chas. Woodrich	2-K							4			4	1	5	7	2	5	2	5	2
37	Van Dyke	H. J. Morrison	2-K	11	19					27	13	118	188	7	195	9.5	10	7	11	7	12
5	Modern	C. J. Bigelow	3-K		26								26	15	41	8	2	7	2	7	3
10	Buick	F. W. Kunze	3-K										Perfect		Perfect	9	9	5.5	6.5	2.812	3
11	Buick	A. Easternay	3-K										Perfect	15	15	8.375	6	7.75	7	4	1.5
27	Krickworth	J. M. Worth	3-K	21									25	25	2	1	7	5	3	3	10
31	C. P. T.	E. W. Aplin	3-K			4	10	11	6	5	5	10	51	86	137	10	19	10.5	7	7	9
33	Chase	H. L. Ferris	3-K		4					2	4		10	76	86	7.5	4	7	3	4	2
1	Gramm	A. L. Nobbs	4-K		1,492								1492	26	1518	10	4	5	2	15	5
6	Hewitt	J. W. Gardham	4-K										Perfect	26	26	9	4	8	6	5.875	6
20	Lauth-Juergens	F. W. Herriek	4-K						6	1	62		27	96	9.5	2	8	2.835	6	4	8
23	Nelson LeMoon	A. L. LeMoon	4-K										Perfect	3	3	7	8	6		2	10
30	Owosso	Wm. Rust	4-K						22	50	24		96	7	103	13	2	9	7.25	7	10
34	Chase	J. O'Brien	4-K	4									4	25	20	9.25	10.5	7.5	6	3.5	4
38	Clark	McCue	4-K			68							68	7	75	16	1	9.25	1	9	3
39	Ideal	W. C. Mills	4-K					2					2	50	52	10	28	9	24.5	6	20.5
32	Federal	R. F. Moore	5-K										Perfect	9	9	10		4	10		10
36	Stephenson	E. H. Zimmer	5-K						5	57		1978	2040	10	2050	18	2	14.875	10	3	15
2	Gramm	A. Withrow	6-K		4					3			7	2	9	15	2	14		7	4
16	Kelly	A. E. Rayner	7-K	4									4	Perfect	4	17	4	16	4	10	3
13	Mais	A. F. Mais	7-K										1	1	15	5	12	2	9	1.5	13
14	Dayton	A. H. Bennett	8-K	1	4		2		2	10			19	27	46	15	24	14	8	10	8
17	Kelly	C. R. Withgott	8-K							3			3	10	13	16.5	5	13	5	10	4
3	Gramm	C. A. Haines	8-K						666	563		122	1351	4	1355	18.5	8	16	5	12.5	2
4	Gramm	A. E. Walden	9-K	4						49	11		64	18	82	30	16	23	4.5	15	8

NOTE.—The class divisions are based on the rated carrying capacity of the vehicles: Division 2-K, from 501 to 1,000 lbs.; 3-K, from 1,001 to 1,500 lbs.; 4-K, from 1,501 to 2,000 lbs.

for the No. 33 Chase and the Chicago Pneumatic Tool entries, the sprockets being out of line causing the chains to come off occasionally. This trouble brought 3 points to the Chase and 10 points to the Chicago Pneumatic Tool.

DORRIS CAR WINS ST. LOUIS RUN

St. Louis, Mo., Aug. 21—The Dorris car, driven by J. E. Baker, won first place in the touring car class in the 4-day reliability run from St. Louis to Kansas City and return, which began August 17, under the auspices of the St. Louis Automobile Manufacturers' and Dealers' Association. Incidentally the Dorris also carried off the special cup offered by the St. Louis Motor Accessories' Association for the car, regardless of class, to finish with the highest score. A protest was filed against the Ford, which was awarded first honors in the runabout class, on the ground that it did not carry stock equipment. The protest was sustained, and the final award made to the Flanders, which had been penalized 2 points.

The route followed going to Kansas City was what is known as the northern highway, and the return trip was made by way of the central route, which has just been adopted as the official state highway.

The Inter-State was penalized 50 points for being late at a control, having lost the confetti and the route. The Parry was penalized for a motor stop due to water getting into the carbureter at a deep ford. The Cadillac was disqualified because the driver misunderstood the rules and worked on his car at a noon stop. The Ohio withdrew because of a series of small disasters, after making a perfect road score for 2 days. The Hudson was penalized for losing the road, and the Marmon drove 50 miles out of its way and was penalized.

HOW COST PER TON-MILE OF TRUCKS WAS FOUND

M = Miles.

W = Capacity in tons (maximum class capacity

2 K 1000
3 K 1500
4 K 2000

 etc.).

D = Driver's wages per day. 9D = total wages.

O = Oil (gal.); .25 O = cost of oil in gallons (3 $\frac{1}{8}$ c a pint).

V = Value of cars less tires.

$$.12 \frac{V}{9} = \frac{1.08}{V} = \frac{.0108}{V} = .0036 V = \text{Depreciation at 12\% per annum.}$$

12	300	300
----	-----	-----

T = Tire cost per mile.

$$9 D + .12 G + .25 O + .0036 V + T \equiv \text{cost per mile}$$
$$\frac{M}{M+1} = \text{cost per mile}$$
$$9 D + .12 G + .25 O + .0036 V$$
$$\frac{1000000}{1000000} + T$$

M — cost per ton-m

W — cost per ton-m

100

The motorists were entertained at each stop, the Automobile Club of Kansas City providing a vaudeville show for the tourists and the Waverly Commercial Club were the hosts of a chicken and watermelon dinner. The final score was:

TOURING CARS

Car	Road Score	Technical Score
Dorris	Perfect.	Perfect
Marmon	3.	Perfect
Mitchell	9.	Perfect
Parry	7	5
Interstate	56	8
Hudson	12	53
Buick	53	36
Ohio	Withdrawn	
Cadillac	Disqualified	

ROADSTERS

Ford No. 6.....	Perfect.....	Protested
Flanders No. 12.....	Perfect.....	2
Ford No. 5.....	35.....	Perfect
Flanders No. 11.....	96.....	2

LONG TOUR PLANNED

New York, Aug. 14—Preliminary arrangements have just been completed for one of the longest tours of its kind ever made, and 2 weeks hence a line of twelve seven-passenger Garford cars followed by a truck will roll out of New York headed for Los Angeles over a trail that covers

4,000 miles. At least fifty passengers will be carried on the trip. The tour is to be conducted by the Raymond & Whitcomb Co. of New York City, a firm which has been running a series of New England tours this summer in which Garford cars were used exclusively with great success. From New York, where the start will be made October 2, to Chicago it is planned to follow the northern route by way of Buffalo and Detroit. Through Davenport and Omaha the tourists will ride, turning south at the latter point to go through Kansas City. Taking up the old Santa Fe trail at this city the road will follow the historic path to New Mexico and from there to the Pacific coast some genuine thrills are promised. A special camping outfit is to be carried on the truck through New Mexico and Arizona and many nights will be spent in the open. It has also been arranged to have Pullman sleeping cars sidetracked at certain of the night controls in the Southwest so that those who prefer may sleep indoors. No traveling will be done on Sundays.

CONSUMPTION OF FUEL AND OIL AND COST PER TON-MILE FOR TRUCK RUN FROM CHICAGO TO DETROIT AND RETURN

5th DAY 92.2 MI.		6th DAY 78.5 MI.		7th DAY 66.9 MI.		8th DAY 69.1 MI.		9th DAY 96.7 MI.		TOTAL 756 MI.		Total Cost, Gas.	Total Cost, Oil.	Total Cost, Driver.	Depreciation, Car Less Tires	Total Cost, Less Tires.	Total Per Mile, Less Tire.	Depreciation, Tires.	Total Cost, Mile.	Tons.	Cost Per Ton, Mile.	Total Cost Per Ton Mile, in- cluding Penal- ties at 1-10 of a Cent per Penalty.	
Gas.	Oil.	Gas.	Oil.	Gas.	Oil.	Gas.	Oil.	Gas.	Oil.	Gas.	Oil.												
4	2	3.5	2	4	2.25	3.5	2	5.5	3	41	18.25	\$ 4.92	\$.57	\$22.50	\$ 1.76	\$29.75	\$.039	\$.03	\$.069	.5	.138	.143 Winner.	2-K
5	10	10	11	7	12	7	8	6	18.5	66.5	108.5	7.98	3.38	22.50	3.24	37.10	.0405	.03	.079	.5	.15816	.353	
10	2	10	1	5		9.5	3	8		74.5	13	8.94	.47	22.50	5.22	37.13	.0491	.02	.0691	.75	.1037	.145	
3.5	4	5.125	8	4.75	7.5	4	5	6.5		44.624	58.5	5.35	1.83	22.50	3.00	32.68	.043	.035	.078	.75	.1170	.147 Winner	3-K
4	3.5	5.75	6	5	5	5	6	7.75	6.5	52.625	47.5	6.32	1.48	22.50	3.00	33.30	.044	.035	.079	.75	.1185	.134	
2	2	5	5	10	4	11	3.5	9	7.5	57	38	6.84	1.19	22.50	4.32	34.85	.046	.02	.066	.75	.0990	.124	
7	7.5		10	8	9	7.75	10	10	13.5	77.75	96.5	9.33	3.02	22.50	3.15	38	.050	.02	.070	.75	.1050	.242	
5	2	7.5	3	8	3	7.5	3	7.875	2	59.375	24	7.13	.75	22.50	2.88	33.26	.0439	.02	.0639	.75	.0959	.152	
2	2	13	6	5	2	17	6	18.875	2	97.875	33	11.75	1.06	22.50	6.75	42.06	.0556	.02	.0756	1.0	.0756	1.593	
5	2	7	4	7.75	11	7	9	8	8	63.625	51.5	7.64	1.62	22.50	4.68	36.44	.0482	.02	.0682	1.0	.0682	.094	
5	2	11	3	5.5	4	7.5	4	10.5	2	71	25.835	8.52	.80	22.50	6.39	38.21	.0505	.02	.0705	1.0	.0705	.167	
5	3	5	2	5	6	5	4	9		52	35	8.24	1.09	22.50	7.20	37.03	.0489	.02	.0689	1.0	.0689	.072 Winner.	4-K
7	2	12	2			19	2.5	11	1	88	17.75	10.50	.56	22.50	6.22	39.78	.0525	.02	.0725	1.0	.0725	.176	
3	3	9	6	9	5	8	5.5	9.5	3	69.75	48	8.37	1.50	22.50	4.50	36.96	.0488	.02	.0688	1.0	.0688	.098	
7	2		2	9.5	1.5	9.5	4	11.125		90.375	17.5	10.85	.55	22.50	6.66	40.56	.053	.02	.073	1.0	.073	.145	
10	14	11	23	8	20.5	8	20	11.125	26	77.625	198.5	9.32	6.22	22.50	4.23	42.27	.0559	.02	.0759	1.0	.0759	.128	
5		10			20	4		16.875	4	96.875	16	11.63	.50	29.97	5.47	47.57	.062	.03	.092	1.25	.0736	.083 Winner.	5-K
5	1	10		14	1	9.5		12	10	108.37	17.5	13.01	.55	29.97	6.20	49.73	.065	.03	.095	1.25	.0760	2.126	
2	2	17	4.5	10	2	19	5	13.75	4	117.75	27.5	14.13	.86	29.97	8.38	53.34	.0706	.03	.1106	2.0	.0553	.064 Winner.	6-K
9	3	16.5	5	13	2	4	4.5	23.875	6.51	21.375	36	14.57	1.13	29.97	9.04	54.71	.0723	.04	.1123	2.5	.0449	.049	
10	1.5	15	2.5		33.5	5.5		115.25	1.5	115.25	17	13.83	.53	29.97	10.80	55.13	.0728	.04	.1128	2.5	.0451	.046 Winner.	7-K
10	2	20	6		17	20	13	20	8	129	92.5	15.48	2.36	37.53	10.84	66.21	.087	.04	.127	3.0	.0423	.088	
15	3	17	6	13	3	12.75	6	20.5	7.5	126.25	45.5	15.15	1.41	37.53	10.08	64.17	.084	.04	.124	3.5	.0354	.048 Winner.	8-K
14.25	2	22	4	16.25	2	6	2	38	8	160.15	39	19.22	1.22	37.53	11.40	69.37	.091	.04	.131	3.0	.0437	1.399	
15	4	4	6	20	4.5	19	2	22.25	13	188.25	62	22.59	1.94	37.53	14.82	76.88	.1017	.06	.1617	5.0	.0323	.114 Winner.	9-K

to 2,000 lbs.; 5-K, from 2,001 to 3,000 lbs.; 6-K, from 3,001 to 4,000 lbs.; 7-K, from 4,001 to 5,000 lbs.; 8-K, from 5,001 to 7,000 lbs.; 9-K, from 7,001 to 10,000 lbs.

Across Western Canada

Pathfinding Trip Through Manitoba, Saskatchewan and Alberta
Discloses Motoring Possibilities in that Part of the Dominion



ential, two spare springs, box of assorted nuts and bolts, two spare Goodyear casings and ten tubes, two pumps, two jacks, a set of four rubber blankets or ponchos, a California water-bottle holding 5 gallons of water, a shovel, bar, sledge, axe, stakes, 200 feet of rope and tackle, three 1-gallon cans of oil and a 5-gallon can of gasoline, which, with passengers, made up a load of nearly 2,000 pounds.

The work of laying out the route was performed by odometer readings to miles and tenths at every turn or landmark. This is the first time a routebook has ever been compiled in western Canada.

BAD LANDS WEST OF LETHBRIDGE;
GOOD ROADS THROUGH MINING COUNTRY



A TRIP of 2,500 miles over the prairie trails of western Canada is something of an achievement for any car, but to make this trip after a season of excessive rains such as this has been, and to return 29 days after the start with car and motor running as smoothly as when it left, despite scores of washed out bridges and other innumerable obstacles with which it had to contend, is the feat performed by the Halladay pathfinder

which has just completed its task of laying out the route for the Modern Power Canadian national reliability tour, which starts September 4. The car returned to Winnipeg on July 29 after an absence of nearly a month, during which a complete circuit was made from Winnipeg to Edmonton and return and the provinces of Manitoba, Saskatchewan and Alberta traversed twice from end to end by the trail-blazers.

Pathfinding Preparations

The pathfinding party left the city of Winnipeg, escorted by an enthusiastic throng of motorists, on Dominion day, July 1, at 3 o'clock in the afternoon.

In order to provide for any possible emergency the car carried as special equipment a spare magneto, spare differ-



WHEN PRAIRIE TRAILS ARE GOOD, THEY ARE GOOD
TO GET OUT OF ALKALI BOG, JACK UP REAR WHEELS AND BUILD A PLANK ROAD



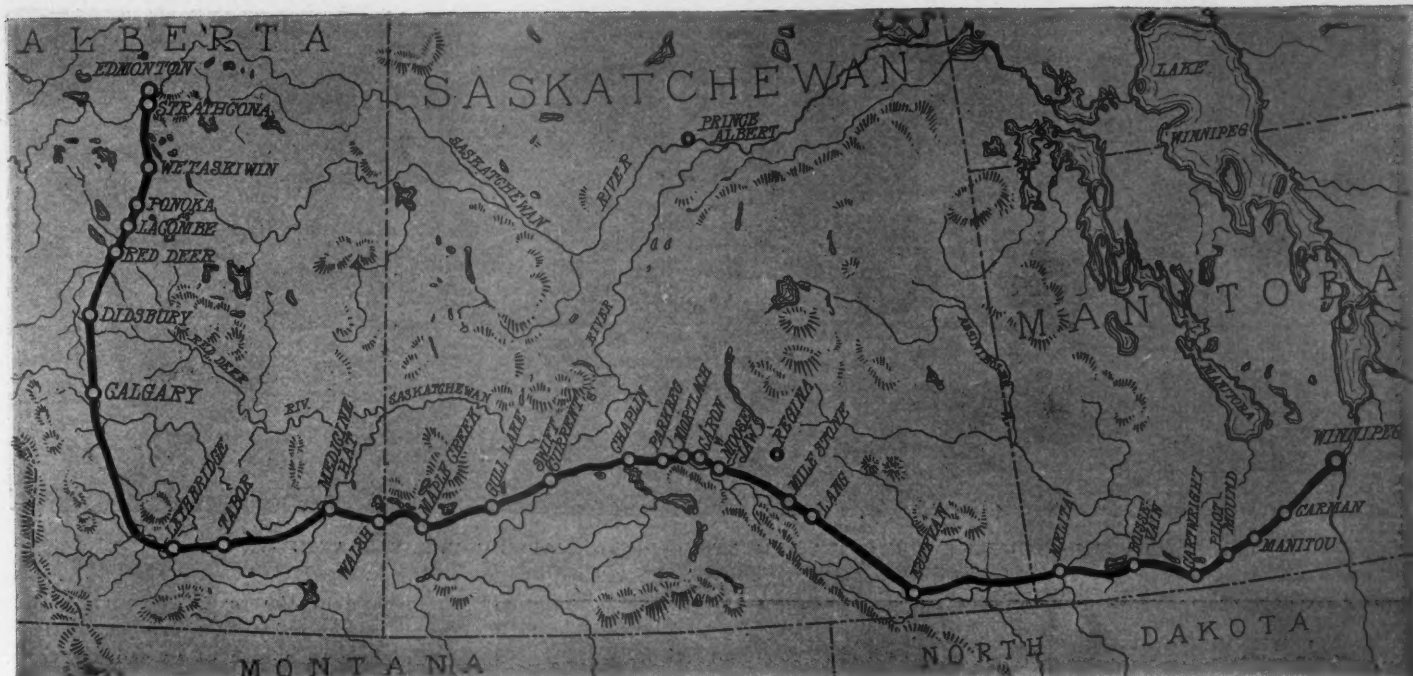
GOOD ROAD NEAR MEDICINE HAT, WHERE AMERICAN WEATHER MAN LIVES AND MAKES HIS PREDICTIONS

The first day's run lay south and west from Winnipeg, and while for the first 30 miles the roads were rough and rutty from recent rains, they rapidly grew better as the car pushed southward. A short stop was made at Carman for supper and the party pushed on, reaching Manitou that night after having covered 103 miles of fair roads from Winnipeg.

The next morning the route lay straight west through southern Manitoba, including the cities of Pilot, Mound, Cartwright, Boissevain, Melita and into Estevan, Saskatchewan, a distance of 247 miles for the day, the only events not scheduled on the day's program being a puncture and a few minutes lost hunting for the road just outside of Estevan. During the greater part of this day's run the pathfinder was favored by having a local car ahead of it to act as pilot, and was thus enabled to maintain good speed without having to retrace any ground. These pilots were picked up at each town and would drop off at the next, where another car would be waiting to take up the run.

Mud Holes and Gumbo Swamps

Up to this point the roads had been uniformly good, the soil light and the country of a gently rolling character with just enough hills to make the trip interesting. From this time on, however, the character of the country changed and leaving Estevan the second morning it was discovered that it had been raining frequently and hard farther west. The route now lay along the Soo Line railway, bearing northwesterly through southern Sas-



ROUTE THAT WILL BE FOLLOWED BY THE CANADIAN RELIABILITY RUN

katchewan, but owing to numerous mud holes and gumbo swamps progress was slow. Time after time the pathfinder was compelled to turn back and detour from 2 to 3 miles from the main road to avoid water.

The first real trouble of the trip was encountered about 3 o'clock that afternoon, when the pathfinder attempted to cross a railroad track over a washed-out grade and the car slid sideways down the embankment, narrowly escaping a bad spill. Here was where the rope and tackle first came into use. One end being fastened to a rail and the other to the car, three of the party undertook to keep the car right side up while the driver, with mud hooks and chains on his driving wheels, applied the power and climbed back up the bank. After several attempts he succeeded and the car came safely across the track, only to find itself con-

fronted by what resembled a lake more than anything else and which forced it to make a long and painful detour through a wheatfield, consuming more valuable time. Just before dusk the car and party rolled into the little town of Lang, Sask., for the night.

Trouble Encountered

That night it rained hard and the next day saw some heavy going from Lang to Milestone, the car several times losing its traction in the soft gumbo. Roads were fairly well graded and for the most part straight, however, and the car reached Moose Jaw at 3 o'clock that afternoon, just in time to miss a rain which lasted all that night and the next morning. The party laid over here nearly 24 hours and did not get away until afternoon the next day, when it had quit raining once more. Leaving Moose Jaw at 2 o'clock the car slipped and slid for 20 miles across a

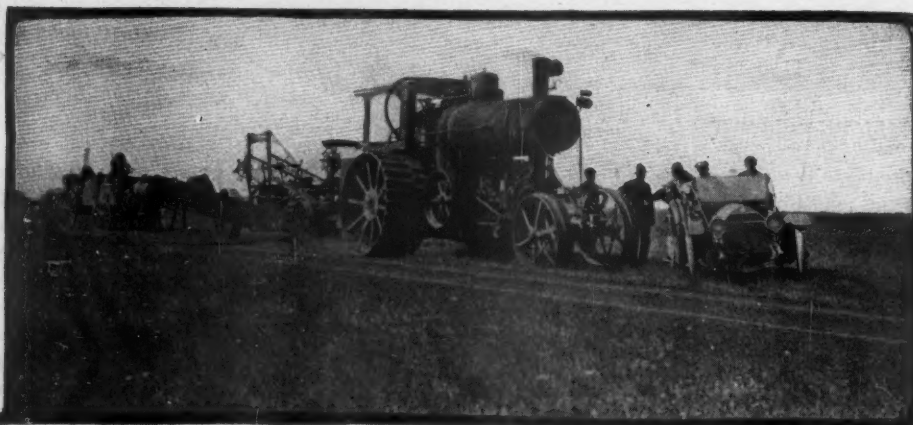
gumbo flat, half the time with wheels in up to the hubs, but always moving ahead. The pathfinder passed two cars completely stalled and another being towed in by a stout team of horses which evidently were having all they could do to pull it through the mud. Shortly afterward the pathfinder met a farmer who, driving three big horses hitched to a disk harrow, had stuck tight in the ditch while trying to cross from the road to his field. When the pathfinder pulled up and offered him a lift, he grinned—just grinned—and while a tow rope was being made fast to his disk and the axle of the car the grin broadened into an expansive smile. First the driving wheels commenced to spin, then the chains cut down to hard bottom and the rope pulled taut. A little more and the disk began to move, strained loose from the sticky grip of the gumbo, and in a second was pulled clear of the ditch to



THE GOOD ROADS OF SOUTHERN MANITOBA. THIS ONE IS NEAR LA RIVIERE



GOOD TRAILS THROUGH THE CATTLE COUNTRY AROUND MAPLE CREEK, SASKATCHEWAN



the middle of the road. Meanwhile the farmer's somewhat derisive smile had given place to a look of pained surprise. Daubner, the driver, didn't charge him \$5 for the job, but offered a little impromptu lecture on the relations of the farmer and the motorist instead, and the farmer had to admit that "There was more power hid under them things than he ever supposed." He concluded by thanking the pathfinder party for the aid and declaring his willingness to return the favor if opportunity ever should present.

As the car went west from Moose Jaw the soil grew lighter and sandier and the roads continually better until at Caron the pathfinder was reeling off its usual 25 or 30 miles an hour, apparently without effort. Mortlach and Parkbeg were passed without more than a pause and the country grew a little hilly. A wrong fork was taken and the car went a few hundred yards out of its way. Daubner struck out across a grassy hollow as a short cut back to the missed forks and—then it happened. The grass was a beautiful blue and very thick. Everything looked fine and dry, but the car commenced to slow down perceptibly. The driver looked worried. He opened the throttle wide and the car stopped, up over its hubs in a bog and with both rear wheels spinning merrily. All around the prairie was covered with a thick sod, but when the crew jumped out of the car the whole hollow shook like jelly. It was a first experience with a real alkali bog.

Adventures in the Mud

Passengers and contents were unloaded in a hurry. Mud hooks were fitted and several determined efforts made to get the car out, but every time the wheels turned over it settled another inch. Finally it was decided to drive a stake and hook onto rope and tackle. It took 15 minutes to drive a 4-foot stake with a 16-pound sledge and about 3 seconds for the engine to jerk it out. A consultation was held and a scouting party sent out ahead. Returning 30 minutes later the scouts re-



THE WAY THEY IMPROVE ROADS NEAR ESTEVAN, SASKATCHEWAN
AN ALKALI BOG AND NOT A STICK OF WOOD IN SIGHT, NEAR SECRETAN
FORDING PIAPOT CREEK IN THE HEART OF THE CATTLE COUNTRY

ported a railroad a mile to the south with several loose ties and a snow fence. The remainder of the evening was spent in lugging ties and snow fence from the railroad line to the car and when darkness came the crew was too exhausted to do anything more. Two of the boys struck for a dug-out they had seen over the hill and made camp there for the night. The other two put up the side curtains and top and slept in the car.

About midnight someone thought he heard a motor running between the howls of the coyotes. Climbing a hill to investigate he saw lights in the distance and a search party set out to see what it was. It proved to be a little Ford stuck in another bog a mile to the north, but a good shove from behind sent it out, after which its party camped with the pathfinders until daylight came.

In the morning everyone felt better and all went to work with a will. Trenches were dug along each side of the car and after jacking up the wheels, short pieces of snow fence board were laid in them to form a sort of sidewalk. The differential and fly-wheel were dug clear, though the mud under the sod was so sticky that it was difficult to pull the empty shovel out of it. At last everything was ready. Daubner started the engine, mounted to his seat and the rest of the crew pulled on the rope, while the cars backed out to the dry ground behind.

Trails in Cattle Country

Chaplin was reached in time for lunch and that night, the fifth of the run, the car pulled into Swift Current, Sask., part of the way over good roads and part of the way over sand hills and the bumps and stones of the open prairie. In many places where the old trail lay along the railroad's right-of-way it had been fenced off. In others the farmers and nesters, who are now rapidly settling up that portion of the country, had plowed over it. Where the old trails of the cattle country were left they were uniformly good.

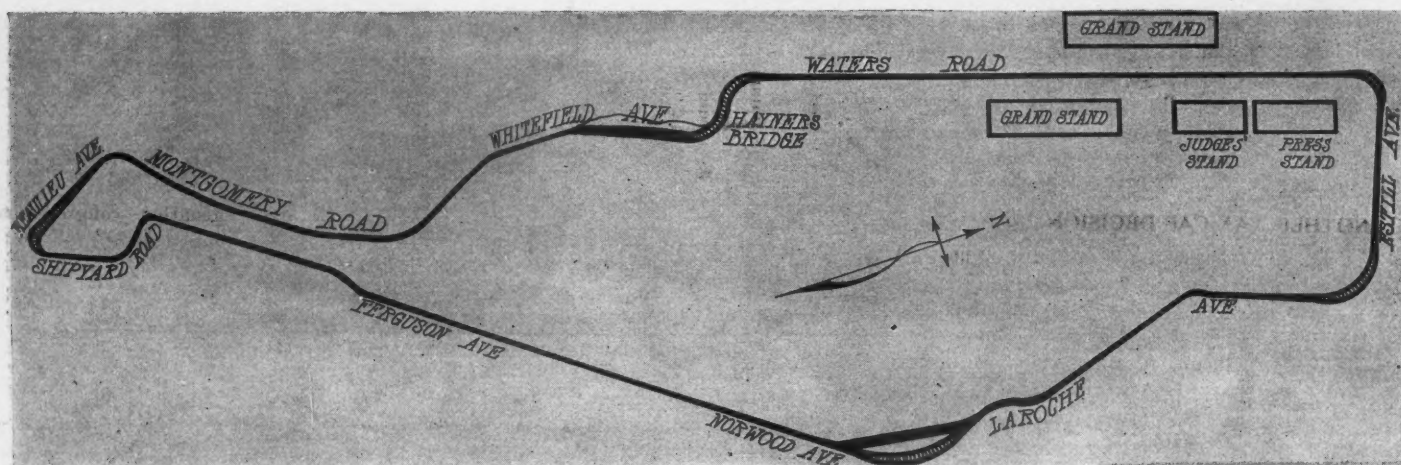
At Swift Current there is a garage and



WHICH FORK? A GOOD ROAD THAT IS LOCATED IN SOUTHERN SASKATCHEWAN
MOUNTAIN STREAM OVERSPREADING ITS BANKS NEAR CALGARY, ALBERTA
A DUGOUT SERVED AS A CAMP FOR THE PATHFINDERS ONE NIGHT



PATHFINDERS RUNNING ACROSS THE OPEN RANGE NEAR WALSH, ALBERTA



MAP OF SAVANNAH RACE COURSE—HEAVY LINES DENOTE CHANGES

a good hotel and when it commenced to rain, shortly after arrival, the travelers didn't care whether they woke up the next morning or not. But with chains on they started out over really fine prairie trails about 10 o'clock and for 30 miles enjoyed a good ride, then the fences and plowings began again and it was a continuous succession of detours looking for the best roads. Toward noon a group of sand hills was reached, which added variety to the scenery. A short stop was made at Gull lake for lunch and the run continued over excellent prairie trails all afternoon. Wherever the old trails of the cattle country were left the going was good with the slight disadvantage of having to open an occasional gate or two. Event number one of this day's run occurred at Piapot, where in crossing an irrigation ditch the bridge broke and the pathfinder lost its muffler; not a very serious accident considering that it had not been used since leaving Winnipeg.

Piapot creek was high over its banks and the bridge across it declared dangerous, but it had a good hard bottom and the pathfinder forded it easily just above the railway company's dam. From there on the roads held good clear into Maple Creek, which is a big stock shipping center in the heart of the ranch country. The last 25 miles were covered in 40 minutes.

Local Pilot Needed

Without a local pilot the car and crew probably would have been lost before they were 10 miles out of Maple Creek the next morning, as the old trails were all fenced off and the new ones not yet well enough broken to be easily followed. Twenty or 30 miles of this bumping the bumps brought the car out on a great plain right on the Alberta-Saskatchewan boundary line and with the town of Walsh, Alta., in the distance. Here the pilot turned back and the pathfinder followed a smooth and well worn trail practically all the way into Medicine Hat, where they let the street lights burn all day because it is cheaper than turning off the natural gas, and where, according to a popular

Savannah Racing Activity

SAVANNAH, Ga., Aug. 21—It is given out by the Savannah Automobile Club that neither the Vanderbilt nor the Savannah light-car race will open the racing calendar in this city, but that on Saturday, November 25, will be the real opening date and that the pushmobile race then would be pulled off. In this city the people think as much about the pushmobile meet as they do the real races and prizes will be given by the Savannah Automobile Club for these events. The race will take place in Forsyth park and the course, which will measure four blocks round, will be patrolled by the city police.

Harvey Granger, president of the Savannah Automobile Club, is in Chicago for the Elgin races and to get entries for the Savannah events. He will also go to New York and try and have the date of the Glidden tour changed from October to some time in November. The work on the grand prize course is rapidly going on and now something like 10 miles has been resurfaced and part of it oiled. The grand stand will also be improved some and extra boxes will be built in the front of the present stand.

myth in the states, all the weather originates.

At Medicine Hat the party stopped for lunch while the car took on gasoline and oil, and then with a local pilot in front continued to make fast time toward the west. All day long the roads held good and with the exception of a few irrigation ditches, obstructions were lacking. Toward evening the car ran into Tabor, Alta., in the heart of the coal mining region, and from there on into the city of Lethbridge the pathfinder hardly ever was out of sight of one or more shaft houses and breakers.

Sight Canadian Rockies

The crew broke the Sabbath the next morning, making a speedometer shaft repair, and then, running in sight of the snow-capped peaks of the Canadian Rockies all the way, made fast time over

the 160 miles to Calgary without mishap, encountering several showers on the way.

At Calgary such an enthusiastic reception was accorded the party and car that it didn't get started away until late the next afternoon, when it immediately ran into a bad rain and was forced to lay over at Didsbury until the next morning.

Resuming the run, Red Deer was reached for lunch and Lacombe shortly afterward, then on to Ponoka, where trouble commenced. Leaving Ponoka the old Calgary-Edmonton trail passes through the Bob-Tail, Sampson and Ermine-Skin Indian reservations. These reserves consist mostly of little mountain creeks and willows. Natives said that it had been raining every day for a month in this country and their statements were well borne out by the condition of the roads. Every little stream was way up and out of its banks, while bridge after bridge was washed out. The party counted twenty-one bridges gone in 18 miles. Nearly all these mountain creeks have hard bottoms and although rope and tackle came into frequent use, it generally was possible to rush them by first wrapping rubber blankets around carburetor and magneto and fastening another over the radiator.

Car Shipwrecked

Water quickly flooded the car and stopped the engine. Both driver and passenger were pretty badly bruised and severely shaken up. A small fire was built from green willows and clothes dried as well as possible, but it gets pretty cold at night up there in the north country, and the pathfinders nearly froze until morning, when rope and tackle again came into play. After drying out the engine the pathfinder resumed its trip and crossed several more creeks before reaching Wetaskiwin, where the crew enjoyed their first meal in over 24 hours. Edmonton was reached without further event that night and a number of local motorists crossed the Saskatchewan river to escort the car in from Strathecona.

So far the car had been on the road just 12 days from Winnipeg and the odometer showed a total of 1,639 miles.



Legal Lights and Side Lights

ANOTHER TAXICAB DECISION

TAXICAB patrons in Baltimore cannot be forced to pay full fare for being carried to their destinations by a circuitous route, according to an opinion handed down by Justice Grannan, in the central police court. The case in question was that of James P. Byrnes, who was arrested on a warrant sworn out by Walter A. Burall. The latter is a chauffeur, who testified that on July 23 he conveyed Byrnes in a taxicab from Chase and Greenmount avenue to the Hotel Lexington. When Burall, according to his statement, requested \$1 as the amount of the fare, Byrnes handed him 50 cents. The passenger remained obdurate despite the fact that Burall submitted the taximeter, which registered \$1. When Burall reached the garage his employer advised the driver to have a warrant sworn out for Byrnes. Byrnes in his own behalf said that he instructed the driver to take him by a straight route that he suggested, but that instead he made the trip by a circuitous route which took twice as long. The magistrate said that the distance by a straight route in his estimation was not a mile and a fraction over and decided against the chauffeur by dismissing the charge against Byrnes.

FIND FLAW IN LAW

Because certain interpretations of the present Maryland motor vehicle law show that even a baby or an idiot may be permitted to operate a car in that state, a special meeting of the board of governors of the Automobile Club of Maryland has been called to discuss changes in the law. This section of the law, No. 137, was brought to the attention of motorists and others through Councilman Garland, who stated that he intended to make some effort to prevent boys and girls from being permitted to drive machines and at the same time stated that in his opinion women also were incompetent to guide a motor car. It is more than likely that the club will ask the next legislature to make a number of changes in the law.

NEW CONNECTICUT LAW

Connecticut's new motor law is now in force, the notices having been sent out from the office of the secretary of state. It contains many changes from the law of 1909, some of the principal ones referring to the reasons why the secretary may suspend or revoke registrations or licenses, particularly in regard to permitting the use of markers, certificates and licenses issued to manufacturers, dealers and private owners, by any person or persons other than the ones to whom they belong.

Both front and rear markers must be fastened so as not to swing and must be

at least 18 inches from the ground. Siren horns must not be used on any motor vehicle excepting fire department apparatus or ambulances. Non-residents are allowed the use of the roads of the state if they have complied fully with the laws of their own state, provided such non-resident has no regular place of abode or business in this state for a longer period than 1 month in the calendar year.

Every person who conducts a public garage must keep a record in a book of every transient motor vehicle left or stored in such garage, together with the name and number of the operator—unless he be the owner—and the time when said vehicle enters and leaves the garage, and the operator must sign his name to the entry. That portion of the law which affects registration does not go into effect until January 1, 1912.

APPEALS WHEEL TAX CASE

Judge Pugh having upheld the District of Columbia motor car seat tax law, the case has been appealed to the district court of appeals by W. S. Duvall, president of the Automobile Club of Washington, who is counsel for Leroy Mark, who brought the test case.

In his bill of exceptions Attorney Duvall points out that the law is void because of indefiniteness, it not being clear whether it is a direct tax levied on a piece of personal property or an occupation tax levied against the owner or operator of the motor car. Furthermore, if it is a direct tax the law is void, because it sets up a standard of taxation, namely, the number of seats the motor car contains, contrary to the standard fixed by the organic act of congress of June 11, 1878, that is the actual cash value. If it is an occupation tax it is maintained the law is invalid for the reason that it fails to describe what right of occupation is to be granted for the tax fee. Furthermore, if it is an occupation tax the law is invalid because it seeks to enforce collection of a second license tax for and the same privilege, that is, operating a motor car on the streets, it being conceded that the car is already licensed and the operator licensed.

Mr. Duvall further maintains that if it is an occupation tax the law is void because it seeks to collect a tax of penalty for the common law right of using the highway for private purposes. It is expected the court will reach the case early in December.

In deciding the case against Mark, Judge Pugh said in part: "I do not know why it is called a wheel tax. It is a seat tax determining the value of the number of seats, and yet congress designates it as a

wheel tax. By legislation congress has made it a crime in this jurisdiction to own or operate a motor car without paying this tax. It makes the operator of a motor car pay \$3 for a seat holding two persons and \$2 additional for each seat above the smallest seating capacity of the car. For operating a motor car and doing exactly the same thing the motorist is required to pay a fee of \$2 under the commissioners' regulation. So, it seems, that motor car owners now pay a tax imposed by act of congress, first, for the identification tag and license; second, on the valuation of the machine as personal property; third, this wheel tax, and fourth, a tax of \$2 for operator's permit. The injustice, the unequal burden imposed upon owners and operators of motor vehicles, the unusual and drastic character of the proceedings to collect this tax are questions which address themselves to the legislation of congress and not to this court. It is a question of expediency and not of power, and however much I may sympathize with motor car owners, it is my duty to determine what the law is and not what the law should be. The result is I must decide against Mr. Mark."

RULES ON CUTOUTS

Tacoma's lawmakers are attempting to govern the use of the cutout, but according to Deputy Prosecuting Attorney George M. Thompson, of Pierce county, the state law on motor cars governs the use of the cutout and the city has no power to legislate on the time when mufflers may be disconnected and when not. The state law, he declares, is very plain and though not altogether observed, as several of the statutes governing the operation of motor cars within the state of Washington it stands unrepealed.

The statute regulating so-called mufflers reads as follows: "Every motor car or motor vehicle using gasoline as motive power shall use the muffler, so-called, and the same shall not be cut out or disconnected within the limits of any city or village within this state."

TELLS CITIES HANDS OFF

Attorney General Hogan of Ohio has rendered an opinion in which he holds that municipalities in the state have no authority to enact ordinances limiting the speed of motor cars. He holds that all that is taken care of by the state law which provides for a speed of 8 miles per hour in business and closely built up sections and 15 miles per hour in the residence sections of municipalities. He says that if city councils would have authority to fix the speed limits in municipalities a great deal of confusion would result to motorists generally.

and a common pastime for the guests who wish to enjoy it is to watch the fishers on the lake with field glasses. There are several detached log cottages in the vicinity of the hotel for the accommodation of guests, and when these are full tents are supplied, with all the natural insect accompaniments thrown in gratis. There is no place to house your car except God's garage, with its blue dome roof, but a convenient pine tree will be pointed out to you by Host Heinzelman where the car may be parked in the shade. A few rowboats are kept at the little floating dock for the use of the guests, and fishing is good.

Rowing on Lake Itasca is a feast of pleasure. The shore scape is mostly pine crowned bluffs and rocky headlands. Winding up the south shore you come to the state school of forestry, where students of woodology from the university at Minneapolis come to pursue their near-nature investigations. A little farther down the shore you come to the outlet, a little stream scarcely ankle deep, but bearing the familiar title of Mississippi river.

Douglas lodge is maintained as a resort for visitors by the park superintendent, Mr. Heinzelman, where board and lodging equal to any average city hotel is furnished at \$2 per day. The park is located about 24 miles northeast of Park Rapids, and is reached easily over a fairly good road well directed by signboards. A 2-days visit usually affords sufficient time to see all the sights and enjoy the somewhat unusual surroundings, and nowhere within convenient motor travel can such natural scenic beauty be found in the northwest.

But Itasca Lake park is not alone in its attractive invitation to motor tourists. Thousands of beautiful lakes, ranging from Leech lake, whose shores dip below the sky line, to little blue deep pockets fairly full of black bass, greet you on every hand, and it has been said that a new lake may be seen every three minutes.

A few miles east from Park Rapids, wilderness bound and strangely beautiful,



LAKE ITASKA. HEADWATERS OF THE MISSISSIPPI RIVER.

lies Mantrap lake, famous for being the home of the muscalonge, the most gamy fish in North America. The state does not allow any fish less than 30 inches long to be taken from this lake, but you seldom are required to throw one back, as most of them are much longer than that.

A little farther east lies Leach lake, famous as being the shore line of Leech Lake Indian reservation, the point where the last battle fought between Indians and white men took place.

The lake shore is so irregular that it measures over 300 miles in extent, and several very picturesque islands increase its scenic beauty. Within a few miles of Walker, a beautiful little city on its west shore, are several Indian villages and the government agency. Indian-made birch bark canoes and birch bark covered tepees are quite common, and a chance to study the Indian problem of our country is available to all. This is a great fishing resort, and great strings of wall-eyed pike, black bass and squirming pickerel may be secured with facility.

A few miles north and a little west are the great logging camps of the great lumber companies which supply the pine for the dwellings of the great northwest. In these woods may be found the best deer hunting of the United States. But the state is very jealous of its game, and al-

lows but 20 days out of the year as open, and but two deer to be killed by one hunter.

The road from Minneapolis is by way of St. Cloud, 66 miles, Sauk Center, 112 miles, Wadena and Park Rapids, and is fairly good for motor car travel. The route need not be previously studied further than I have mentioned, as the chances of going wrong are very remote. Good hotels and garages are to be found in all the cities mentioned, and charges are reasonable. The road from Park Rapids to Mantrap lake, McMahon's resort, is the hardest of the entire distance to make, but with care and a powerful slow gear the sand hills and short curves between huge pine trees may be easily and safely made. The season opens about June 1 and lasts until November 20, the end of the deer hunting season. Fishing is best in June and September, but is fairly good in the hot summer months.—A. D. Hard, M. D.

IOWA TO NEW YORK

Casey, Ia.—Editor Motor Age—Will Motor Age please favor me with the best and most direct route between Des Moines, Ia., and Buffalo, N. Y.?—Wm. Skellenger.

Follow Blue Book routing from Des Moines all the way to Buffalo. The famous river-to-river road across Iowa is traversed from Des Moines through Altoona, Mitchellville, Colfax, Newton, Grinnell, Brooklyn, Victor, Ladora, Marengo, Homestead, Oxford, Tiggin, Iowa City, West Liberty, Moscow, Wilton, Durant, Walecott, Davenport, Moline, Hillsdale, Erie, Lyndon, Sterling, Dixon, Rochelle, De Kalb, Geneva, Lombard, Chicago. Approximate distance Des Moines to Chicago, 360 miles.

On the way to South Bend the popular road takes you through Jackson Park, Bryn Mawr, South Chicago, Hammond, Highlands, Hobart, Valparaiso, Westville, LaPorte and New Carlisle. The South Bend-Buffalo portion is as follows: Mishawaka, Goshen, Ligonier, Kendallville, Bryan, Wanton, Toledo. From Toledo to Cleveland, a good settled summer weather



DOUGLAS LODGE WHICH OVERLOOKS LAKE ITASKA

route is via Fremont, Castalia, Sandusky, Huron, Lorain, Cleveland. This will be found an exceedingly delightful run, but is not recommended as the best all-year-round route because of the clay, which makes difficult traveling after rains. In case of bad weather an alternate route would be Toledo, Woodville, Fremont, Clyde, Bellevue, Monroeville, Norwalk, Berlinville, Birmingham, Henrietta, Amherst, Elyria, Ridgeville, Dement, Dover and Cleveland. From Cleveland to Buffalo you will have good roads most of the way, but because of the clay the roads are heavy after rains. The towns passed through are Willoughby, Madison, Geneva, Ashtabula, Conneaut, West Springfield, Girard, Erie, Westfield, Freedonia, Irving, Buffalo.

ALABAMA TO NORTH CAROLINA

Lanewood, Fla.—Editor Motor Age—As I am contemplating driving my car from Florala, Ala., to Asheville, N. C., could Motor Age furnish me with a map, guide or route information between these two points?—T. J. Britton.

Florala is 125 miles from Montgomery through Greenbay, Opp, Elba, Springfield, Troy, Orion, Doubling, Ramer, and Snowdown. In case you desire any information we are advised that W. D. Patrick, who is an enthusiastic member of the Alabama Automobile Association, will furnish any advice possible.

Leaving Montgomery, go through Mount Meigs, Tuskegee, Auburn, Opelika, Beulah, Glass, Langdale, La Grange, Hogansville, Grantville, St. Charles, Moreland, Newman, Ga., McCollon, Palmetto, East College Point, Atlanta, Decatur, Ingleside, Scottdale, Stone Mountain, Snellville, Lawrenceville, Auburn, Winder, Commerce, Franklin, Royston, Canon, Lavonia, Anderson, Piedmont, Oak Grove, and Greenville. You leave the national highway and travel through Hendersonville, N. C., to Asheville.

DANVILLE TO JACKSONVILLE

Danville, Ill.—Editor Motor Age—We would like to have some information as to the best route from Danville, Ill. to Jacksonville, Fla., also where suitable maps can be procured of the route.—R. Holmes & Bros.

Motor to Indianapolis from Danville through Covington, Veedersburg, Hillsboro, Crawfordsville, Whitesville, Jamestown and Brownsburg. From Indianapolis the shortest route lies through Louisville, Ky., and takes the tourist through Seymour, Uniontown, Gruthersville, Scottsburg, Vienna, Underwood, Henryville, Memphis, Sellersburg and New Albany.

To Nashville through the Blue Grass state, which is full of historical places of interest, takes you through Fern Creek, Mt. Washington, High Grove, Bardstown, New Haven, Athertonville, Buffalo, Magnolia, Hardyville, Uno, Bear Wallow, Cave City, Glasgow Junction, Oakland, Bristow, Bowling Green, Franklin, White House,

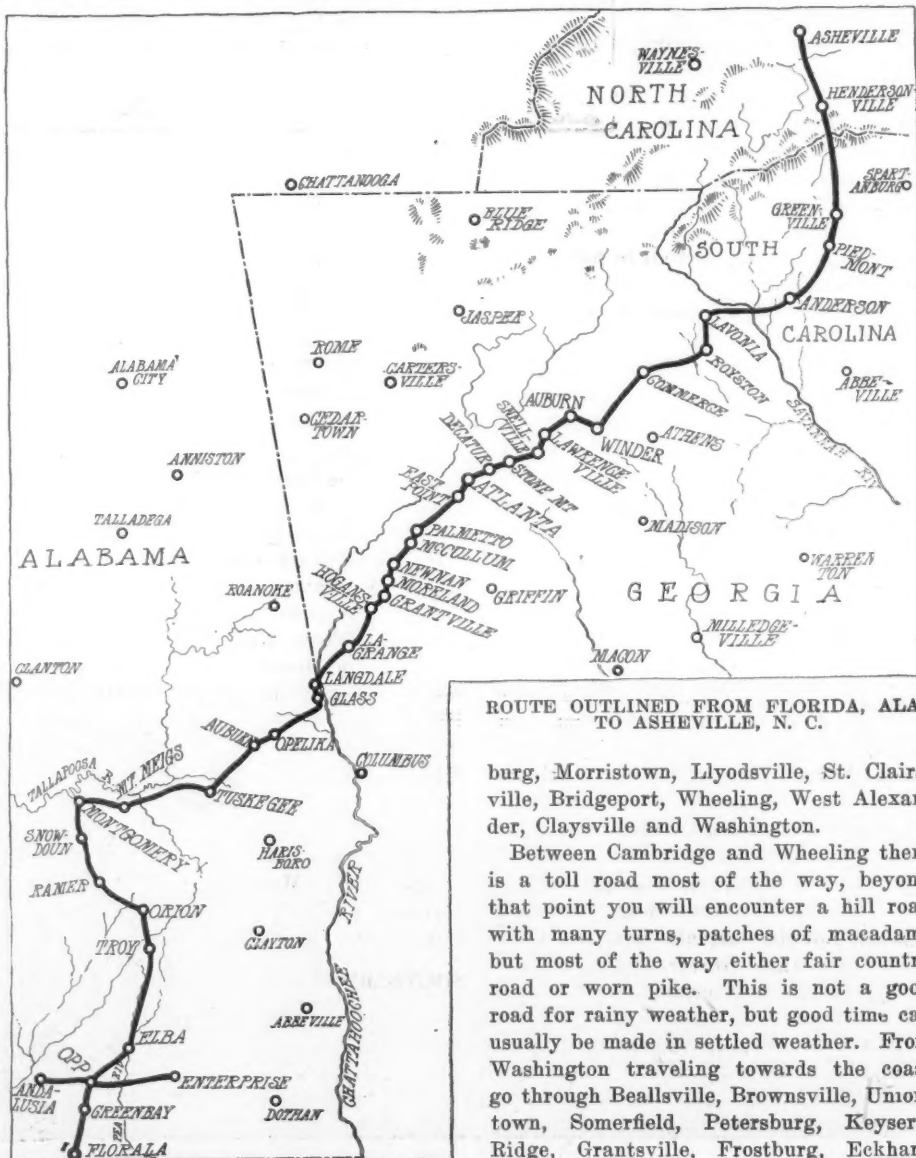
Tenn., and Goodlettsville.—The Lincoln Farm, which is a short distance from Athertonville, and the Mammoth Cave out from Cave City should be visited. Fayetteville, Huntsville, Scottsboro, Bridgeport, Jasper, Chattanooga, Lafayette, Rome, Cartersville and Marietta take you into Atlanta. A short cut from Nashville to Chattanooga is through Murfreesboro, Manchester, Tracy City and Jasper. Chattanooga to Atlanta, Ga., lies through Lafayette, Summerville, Rome, Cartersville, Acworth, Kennesaw, Marietta; Atlanta to Macon—Jonesboro, Lovejoy, Hampton, Pomona, Griffin, Milner, Barnesville, Forsyth, Smarrs, Bolingbroke, Loraine; Macon to Jacksonville—Hawkinsville, Abbeville, Fitzgerald, Douglas, Wayercross.

Should you desire to motor to Savannah and thence along the coast to Jacksonville from Macon, go through Milledgeville, Sandersville, Davisboro, Louisville, Waynesboro, Perkin, Millen, Searboro, Rockyford, Statesboro, Stilson, Savannah, Riceboro, Eulonia, Darien, Brunswick, Old Sterling, Tarboro, Owens Ferry, Kings Ferry and Callahan. At Darien you can secure a Darien-Dents landing ferry for \$5; at Owens Ferry and Kings Ferry your

charges on the ferry will be \$1 each place.

Perhaps you wish to make a longer trip, and one of that nature would take you to Hagerstown, Md., thence south through the Virginias and the Carolinas. Traveling on the old national pike from Indianapolis pass through Cumberland, Greenfield, Ogden, Louisville, Dublin, Cambridge City, Centerville, Richmond, Eaton, New Lebanon, Dayton, Harshman, Fairfield, Enon, and Springfield, where you will find mostly excellent gravel pike roads following through Harmony, Vienna, Brighton, Somerford, Lafayette, W. Jefferson, Alton and Columbus.

Here you have an option of two routes, one continuing on the National Highway through Reynoldsville, Etna, Hebron, Jacktown, Linnville, Brownsville, Gratiot, Hopewell and Mt. Sterling to Zanesville, or the other, which is 5 miles longer but over fine macadam, good dirt and gravel roads via Newark through Granville, Newark, Hanover, Nashport and Irville to Zanesville. Still keeping to the national highway, taking in Cambridge and Wheeling, pass through Bridgeville, Norwich, New Concord, Cambridge, Washington, Elizabethtown, Fairview, Hendrys-



ROUTE OUTLINED FROM FLORIDA, ALA., TO ASHEVILLE, N. C.

burg, Morristown, Llyodsville, St. Clairsville, Bridgeport, Wheeling, West Alexander, Claysville and Washington.

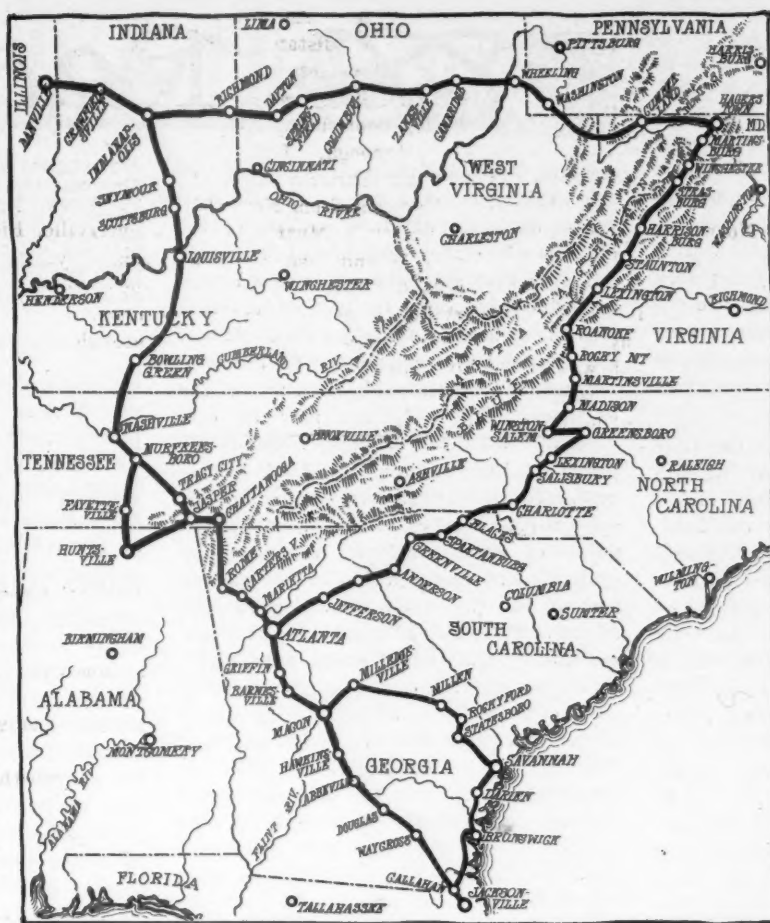
Between Cambridge and Wheeling there is a toll road most of the way, beyond that point you will encounter a hill road with many turns, patches of macadam; but most of the way either fair country road or worn pike. This is not a good road for rainy weather, but good time can usually be made in settled weather. From Washington traveling towards the coast go through Beallsville, Brownsville, Uniontown, Somerfield, Petersburg, Keyser's Ridge, Grantsville, Frostburg, Eckhart,

Cumberland, Flint Stone, Hancock, Clear Spring, Hagerstown.

The New York-Atlanta highway is traversed now through Tilghmantown, Battlefield of Antietam, Sharpsburg, Shepherdstown, Halltown, Charlestown, Clifford and Berryville. A more direct route from Hagerstown lies through Williamsport, Martinsville, Clarksville, Bunker Hill, Ridgeway, Clear Brook and Winchester. The latter is a distance of 41.8 miles, and the former 58 miles. Continue south through Stephen City, Midletown, Strassburg, Maurertown, Woodstock, Edinburg, Mount Jackson, New Market, Lacey Springs, Harrisonburg, Mount Crawford, Burkstown, Verona, Staunton, Minto Springs, Breenville, Midway, Fairfield, Lexington, Fancy Hill, Natural Bridge, Buchanan, Troutville, Cloverdale, Roanoke.

The road between Martinsville and Roanoke is a rough, mountainous one. In fact, continuous stretches of first-class roads in the South are very scarce. Anyone contemplating a trip over southern roads should be well provided with block and tackle, and it would be well to have a car with a 60-inch tread. There are many toll-gates on this route and at each a toll of 15 cents is charged. The Blue Book states that it is necessary to register name, residence and license number with each gate keeper, and in order to facilitate matters suggests that 15 cents be placed in nineteen envelopes, the name, residence and license number appearing on the outside, and at each toll-gate hand the keeper an envelope.

From Roanoke to Winston-Salem you pass through Rocky Mount, Syndorville, Oak Level, Martinsville, Ridgeway, Stoneville, Madison, Ellisboro, Stokesboro, Kernersville and Centerville. You will have to ford many small streams, the first part being very hilly, with deep grades. The itinerary from Winston-Salem to Atlanta is as follows: Summerfield, Guilford Battle grounds, Greensboro, Jamestown, High Point, Thomasville, Lexington, Spencer, Salisbury, China Grove, Kanapolis, Concord, Newell, Charlotte, Sloane's Ferry, Belmont, Lowell, Gastonia, Bessemer City, King's Mountain, Grover, N. C., Blacksburg, S. C., Gafney, Converse, Spartanburg, Duncan, Greer, Greenville, Oak Grove, Piedmont, Anderson, Lavonia, Canon, Royston, Franklin, Commerce, Winder, Auburn, Lawrenceville, Snellville, Stone Mountain, Scottdale, Ingleside and Decatur.



OPTIONAL ROUTES FROM DANVILLE, ILL., TO JACKSONVILLE, FLA.

The route from Atlanta, Ga. to Savannah, or Jacksonville, Fla., can now be traversed as outlined above.

SIoux CITY TO CABOOL

Sioux City, Ia.—Editor Motor Age—Will Motor Age inform me the best route to Cabool, Mo., from Sioux City, Ia.?—O. A. Kindig.

Sioux City, Ia., to Kansas City, Mo., 352 miles, is through Salix, Sloan, Whiting, Onawa, River Sioux, Missouri Valley, Crescent, Council Bluffs, Omaha, Randolph, Shenandoah, Tarkio, Burlington Junction, Maryville, Savannah, St. Joseph, Hall, Atchison, Lowmont, Leavenworth and Wallula. From Kansas City the route lies through Grand View, Belton, Harrisonville, Lone Tree, Adrian, Butler, Rich Hill, Wales, Nevada, Nassau, Milo, Sheldon, Irwin, Lamar, Jasper, Boston, Cary Town, Flint, Carthage, Webb City and Joplin. Through Missouri the roads in the spring are heavy but good in late summer. From Joplin go to Diamond, Pierce City, Monett, Verona, Aurora, Marionville, Billings, Republic, Springfield and Cabool.

SOUTHERN WISCONSIN ROUTE

Guttenberg, Ia.—Editor Motor Age—Through the Routes and Touring information department will Motor Age kindly give me the best route from Glen Haven, Wis., to Janesville, Wis., and from Dubuque, Ia., to Janesville, Wis. Which is

the better route as to roads, scenery, etc.?—R. Kuempel.

Glen Haven to Janesville is as follows: Lancaster, Platteville, Belmont, Calamine, Darlington, Monroe, Brodhead, Hanover and Janesville.

Dubuque to Janesville is through the following towns: Fairplay, Hazel Green, Benton, Leadmine, Shullsburg, Warren, Nora, Lena, Freeport, Rockford, Roscoe, Beloit and Janesville. This is a route from the Blue Book volume 4 and they state that the first half of the distance to Rockford is mostly clay with very steep and rough hills, but that it is a beautiful ride in dry weather. You are cautioned to watch out for water bars on all hills. Rockford to Janesville is over gravel or macadam all the way. From Rockford to Janesville the route follows very closely the course of the Rock river into Beloit, probably best known through Beloit college, which is located in the heart of the city. It is one of the best of the smaller colleges in this country.

From Shullsburg you can travel to Darlington and continue over the first mentioned route, thus eliminating Rockford and Beloit. Undoubtedly you will enjoy this tour, for the scenery along the way is most picturesque.

IOWA TO CANADA

Milford, Ia.—Editor Motor Age—I want to motor to Winnipeg this coming month. I have to go to Worthington, Minn., and thought of going to Pipestone, Flandreau, Fargo, Grand Forks, thence to Emerson, Manitoba. Or would it be best to go via St. Paul?—F. A. Heldridge.

From Worthington motor to Valley Springs, Brandon and Sioux Falls, thence north to Dell Rapids, Trent, Egan, Flandreau and Brookings. To Watertown follow the railroad about 50 miles and about 35 miles to Milbank directly northeast. Travel to Big Stone, Oriskany, Clinton, Graceville, Dumont, Wheaton, White Rock, Fairmount, Wahpeton, Breckenridge, Dwight, Abercrombie, Christine, Hickson, Fargo, Georgetown, Perley, Hendrum, Halstad, Shelly, Heilsville, Climax, Belmont, Reynolds, Thompson and Grand Forks. From Grand Forks follow the railroad to Emerson and Winnipeg fairly closely. Eliminating Sioux Falls from the trip, travel from Worthington to Beaver Creek, Luverne, Pipestone and Egan. You will not find the roads so much better on the whole to warrant your making the detour to St. Paul.

USE BETTER OIL

SAGINAW, MICH.—Editor Motor Age.—The reply to the reader from Maysville, N. D., in the Reader's Clearing House in the issue of August 3 is right, but it may not be for the reason given. There is every likelihood that his oil is vaporizing and mixing with the explosive charge, rendering it so fat that it fails to fire, or if it does fire it fails to give full power. And the worst feature of this action is that it is so irregular. The engine case gets heated up to the critical point where if the engine gets any hotter the mixture gets too fat.

The slowing down following this loss of power lets the conversion of oil into vapor go on in greater amount and makes the matter worse till the engine can hardly run at all. It misses or stops. As soon as it cools some it can be started without much trouble or with some symptoms of over-fat mixture only to repeat the trouble as soon as it warms up a little. Shutting the carbureter down so as to compensate for the excess from the fuel sometimes will keep it running but just as soon as it speeds the engine up a little there is not enough time for the oil to vaporize and the symptoms of starvation appear. It is a very aggravating trouble and even four-cycle engines suffer from it, but not so much as the two-cycle. The remedy is a better and higher test oil as suggested.—Charles E. Duryea.

RADIATOR CLEANING

Pemberville, O.—Editor Motor Age—Will Motor Age please answer the following questions:

1. I noticed in previous issues of Motor Age that crystals of soda were recommended for cleaning radiators. What are crystals of soda? Is it known by other names? What is the usual retail price? Is it a solvent for lime and magnesia sediment or scale as results from the use of hard water as a cooling agent for stationary and motor car engines? If not, what should be used for the removal of such scale, and what is the best method of using it, more particularly for a stationary engine?

2. Would it be practical to use metal tubing in place of rubber for radiator connections, thus making it possible to use kerosene as a cooling agent in cold weather?

3. Would the vibrations of the motor be transmitted to the radiator over metal connections to such an extent as to injure it?

4. Are anti-freezing compounds, manufactured and sold as such, practical and their use free from future trouble such as deposits on walls of the radiator and engine water jacket?—Reader.

1. Crystals of soda are obtainable as such from almost any grocer or druggist at a cost of about 10 cents per pound. It might be called common washing soda, though there are a number of common

The Readers

washing sodas on the market. Many of the washing sodas, however, are not useful in cleaning radiators, because of the alkalies which they contain and other constituents that are liable to have a strong corrosive action on the metals entering into the structure of the radiator. Almost any of the boiler compounds on the market, which are obtainable from any of the engineers' supply houses, may be conveniently used for cleaning scale or deposits of lime from a radiator. If you prefer to make your own compound, dissolve 2 pounds of crystals of soda in each gallon of water contained in the cooling system. Put this solution in the cooling system, run the motor for a few seconds so the solution is well distributed throughout the system; let it stand over night, then flush out thoroughly in the morning with clear water. When flushing out a radiator, see that there is an unobstructed flow of water through it. It often is beneficial to reverse the flow of water through the radiator in flushing it out, because often there are little scales of lime jammed in parts of the radiator which cannot be dislodged in one direction, but which will loosen up very readily when the flow of the water is reversed.

2. No practicable method for using metal connections between the radiator and motor of a motor car has as yet been brought out; but rubber connections coated with shellac on the inside have given fairly good service. Even unshel-laced rubber hose connections can be used though they will require replacement at frequent intervals.

3. If the connection was a light one the radiator might not be damaged but the connection would hardly last as long as a rubber one; and if it be a heavy one the radiator most probably would be damaged.

4. Motor Age has no complaints on record against the anti-freezing compounds that heretofore have been sold to

EDITOR'S NOTE—To the Readers of the Clearing House columns: Motor Age insists on having bona fide signatures to all communications published in this department. It has been discovered that the proper signature has not been given on many communications, and Motor Age will not publish such communications, and will take steps to hunt down the offenders of this rule if it is violated.

motorists, and as to the practicability of anti-freezing compounds or mixtures, there is no doubt. Each year as the cold weather sets in, a number of effective anti-freezing mixtures for use in the cooling systems of motor cars are published in the columns of Motor Age.

WANTS TO BE REPAIRMAN

Sapulpa, Okla.—Editor Motor Age—I desire to become a motor car repairman and mechanic. I can get a job in a garage here, that is, to wash cars and do odd jobs around the shop. I will be permitted to work around the cars and the garagemen will teach me as much as they can. I am also able to go to some good motor car school and take a course in motor car repairing. What I want Motor Age to do is to tell me which would be to my advantage to do. To go in the garage here, or to go to some good school.—Oklahoma.

With most people, it is found in learning any trade that best results are obtained by learning the theory and practice of the trade at the same time. Such a combination is offered by any good motor-car school, but you will probably get more out of a course in one of these schools by working for a few weeks or months in the garage. You will know then where in you are weak and will be better able to absorb the knowledge offered in the schools. While working in the garage read all the periodicals bearing on your trade and any textbooks you can get treating on motor-car construction and operation—it will keep you busy. By all means go to the motor-car school if possible, either before or after a term in the garage; if it is impossible to spare the time for a course in a residence college, follow a definite line of study, such as laid out by the better class of correspondence schools, at the same time getting the practical experience in the garage.

DOES NOT LIKE INNER CASINGS

Titusville, Pa.—Editor Motor Age—Having just read the communication on canvas inner casings in the issue of July 20, I thought I might save some one from the very annoying and expensive experiences I have recently had with heavy canvas inner casings. In 30 by 3 or 32 by 3½ casings they seem to work all right, and will prevent blowouts and do not seem to injure the inner tubes, but

HELPFUL TO THE AMATEUR

Oklahoma City, Okla.—Editor Motor Age.—Here is an idea that may be of great help to Motor Age subscribers, who, like myself, knew nothing at all about a motor car when the first car was bought. Having saved all my copies of Motor Age for the last 2 years, I recently clipped from them the Repair Shop pages, the Readers' Clearing House pages, and other information along that line relative to the up-keep of cars. This made a total of over 700 pages which I had bound in book form, and now I have a book almost priceless to an amateur. The many cuts with parts marked showing the timing, action of valves, etc., I consider especially valuable.—E. C. Wills.

Clearing House

EDITOR'S NOTE—In this department Motor Age answers free of charge questions regarding motor problems, and invites the discussion of pertinent subjects. Correspondence is solicited from subscribers and others. All communications must be properly signed, and should the writer not wish his name to appear, he may use any nom de plume desired.

in 37 by 4½ casings they have given no end of trouble—pinching and cutting the inner tubes, and heating them so that they would give out sometimes even before the car was run after putting them in and pumping them up. I tried them on two different sets of casings and put them in with great care after the first trouble, but the result was always the same, and I feel sorry for any one who may try them as I have.—W. C.

MAGNETO COUPLING NOISE

Glenburn, N. D.—Editor Motor Age—Our 1911 Regal 30 runs smoothly on the battery but makes a clattering sound when switched onto the magneto. The noise seems to come from where the shaft, that drives the magneto, passes through the supporting arm of the motor. If we take a long stick and bear up heavily under the shaft the noise ceases.—J. E. Thayer.

This clattering sound, which is only apparent when the motor is running on the magneto, is caused by the magneto not being lined up properly with the magneto shaft bearing in the arm of the motor. If the magneto is not properly lined up, it will cause a thrust on the magneto shaft gear inside the gear case causing this gear to run eccentric and so necessarily produce the rattling sound. When the motor is running on the battery of course the armature of the magneto is running free, but as soon as the switch is thrown over on the magneto side the magneto will generate the electrical current and this throws several pounds of strain on the magneto armature. So if the magneto is out of line or the magneto coupling is loose either condition may cause considerable noise when the switch is thrown from the battery side over to the magneto side.

This difficulty easily can be corrected by lining up the magneto. This can be done by loosening the magneto from its bracket and slipping thin copper shims between the bracket and magneto until it is lined up properly.

WHY THE ENGINE MISSES

Elmira, N. Y.—Editor Motor Age—A gasoline engine may miss-fire for more than one cause, and the true cause of its miss-fire is usually overlooked and something else tinkered to remedy the defect, with but little success. Some years ago when I was in the noviate class try-

ing to run my car I had much trouble; as a matter of fact the majority in this class usually find when trying to learn the driving business. I recall one instance which will bear repeating for the use of some one who has had his engine behave in like manner, and may be the cause of helping him out in the matter. My engine at times would miss on first one cylinder and then another and my power was extremely weak and wanting. I tried everything imaginable, adjusting from carbureter to sparkplugs, coil and strength of current, but still that miss. After a heap of trouble and vexatious work with no results I made up my mind that I would take out the carbureter and see if it was not the real cause of the missing. I shut off the gasoline from tank, detached the supply pipe, unbolted the connection at the intake pipe and took it out. I then took off the cap, removed the float and could not see anything wrong. I then opened the mixing chamber and here in the bottom was the real cause of my trouble and worry. About a half teaspoonful of fine sand had been sucked in at the air valve opening and settled right below the spraying nozzle, which would at times become choked by the sand, not allowing the gasoline to rise to its proper place to be mixed with air and form its correct mixture. I took a syringe and good strong soapsuds and washed the entire carbureter, carefully dried it out, replaced each part as it belonged and let on the gasoline, when presto! my miss-fires were no longer in evidence and the motor worked to real perfection, and each of the cylinders did its duty most effectively. Several times since then I have had occasion to repeat this little trick of taking the carbureter apart and cleaning and like results have invariably followed.

If some of my motor brethren who ask

Motor Age so many questions in reference to their motors missing, would try this little bit of a job I am certain they would be pleased with the result, and think how easy it is for one to think for himself, for if we did not have the Motor Age to go to for this and that advice what would we do?

In replacing the parts one must be very careful to not mar or in any way injure these delicate pieces, nor screw down the screws or adjustments too tightly, as you will be liable to seriously damage them and necessitate new ones at high prices. Also be careful to see that no water is left in at any place, as this would, perhaps, cause you a lot of trouble when you tried to start the motor.

I have tried various devices to prevent the dust from entering this delicate part, such as fine wire screen, cloth, a tin pipe made long enough to raise up the part where the air enters, with little or no success, for after I thought I had it cinched missing would, after a while, occur again, which would require the former treatment, and I feel certain that many a motorist has had the same trouble and without doubt found the remedy, but if he had not this little bit of experience may help him out of a lot of trouble.—Reader.

PRESSURE MOTOR OILING

Elgin, Ill.—Editor Motor Age—In reading over the many car descriptions in Motor Age from week to week I am struck with the fact that so few makers are giving up the splash system of lubrication. I believe that a pressure system is the ultimate one for the motor of a gasoline car. Let me make myself clear in what I mean by a pressure system: A pressure system is one in which the oil pump forces oil to the cylinder bearings, through the drilled crankshaft to the lower connecting rod bearings and up the connecting rods in copper tubes to the wrist pin bearing at the top of the connecting rod. This is a positive system. It is a system in which the oil is forced to every important motor bearing by pump pressure. There is not any guess work about it. We read from week to week about motor bearings burning out at high speed for want of oil, but so far as I know these cases are all in motors that have not a positive oil feed as stated here.

I believe that there are as many troubles due to too much oil being fed as to not enough. The majority of the carbonization is due to an over feed of oil. With splash systems there is almost sure to be too much oil feed. Is it not strange how some makers put baffle plates across the lower ends of the cylinders to prevent too much oil being splashed into the cylinders and against the walls and how other makers are trying every scheme to get more oil into the cylinders? There must be something radically wrong in one of the systems. It seems to me that

NOTICE TO READERS

Motor Age has received communications addressed to the Readers' Clearing House from the following named towns and nom de plumes:

Chicago—Subscriber.
Washington, Ia.—A Subscriber.
Shreveport, La.—Reader.
Julesburg, Colo.—Yours Very Truly.
Mount Carmel, Ill.—
Enid, Okla.—Bill.
Goshen, Ind.—Subscriber.
Kearney, Nebr.—Reader.
Goose Lake, Ia.—Amateur.
Chicago—F. E. B.
Rocky Mount, N. C.—Reader.
Urbana, O.—Subscriber.
Kane, Pa.—Reader.
Boulder, Colo.—Reader.
Woodstock, Ill.—Oskaloosa.

These communications will be held until the proper signatures have been received. All communications written over a nom de plume must bear the writer's signature, otherwise such communications will not be answered. These signatures are wanted as proof of the authenticity of the inquiries.—Editor Motor Age.

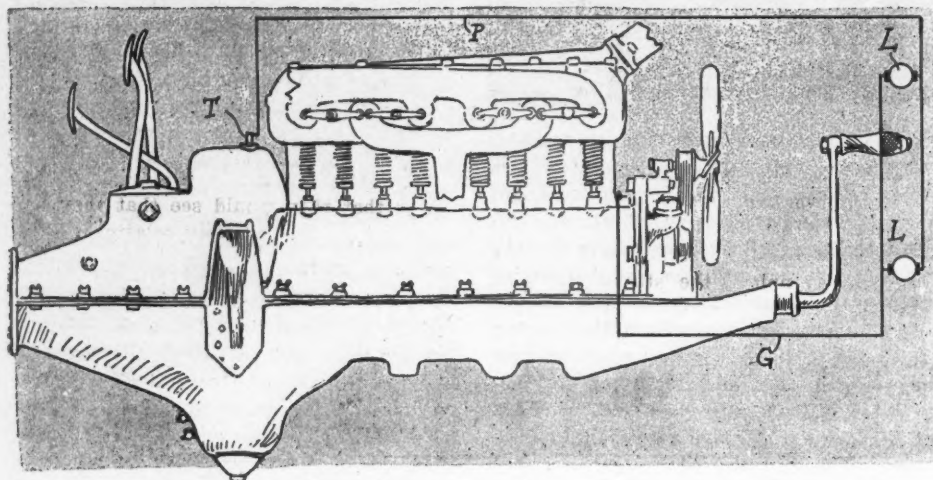


FIG. 1—WIRING FOR MAGNETO HEADLIGHTS ON FORD

the proper system is the one that feeds the proper amount of oil at the proper time. The pressure feed system does this. The feed of oil is proportional to the speed of the motor. The faster the speed of the crankshaft the greater the demands for oil and the faster the pump works delivering the oil. This is as it should be.

It seems to me that with a splash system that the faster the crankshaft revolves the less oil is splashed into the cylinder walls. The reason is apparent: Each time the lower end of a connecting rod cap cuts through the pool of oil in the crankcase the oil is separated. It takes this oil some time to flow back to fill the space cut through by the connecting rod. With a motor turning over 2,000 revolutions per minute there is just three one-hundredths second for the oil to flow back into place. This is a short time and it is a certainty that it frequently does not get back into place, the result being that at the time the greatest splash is needed the least is obtained.

One other objection that I see to the splash system is the needless churning of the oil by the connecting rod caps dipping into it. This constant churning is not good for it, and the less the churning the better for the lubricant.

I would like to know what other readers of Motor Age think of this motor lubricating matter.—Tourist.

TURNING CORNER STRAIN

Earlville, Ill.—Editor Motor Age—Through the Readers' Clearing House kindly answer the following question: When a motor car is turning a corner upon which of the rear wheels is most of the power thrown; that is, which wheel does the bulk of the pulling?—Reader.

In turning a corner to the right, with an ordinary differential, the outer wheel, that is, the left rear wheel, does the driving, or the most of it. In turning to the left the rear right wheel does the driving, or pulling as you term it. When turning to the right the greatest strain is on the outer wheel, because if the speed were

great and there was a tendency for the car to upset, the inner wheels would leave the ground first. Although many artists have illustrated racing cars turning a corner on the inside wheels, and with the outer wheels off the ground, this is not the case. It is the inner wheels that leave the ground first and consequently the major strain is placed on the outer ones.

LIGHTING ON FORD MAGNETO

Mayville, N. D.—Editor Motor Age—Through the Readers' Clearing House will Motor Age answer the following questions?

1—Would it make any difference to move the water tank farther away from the engine on a Detroit stationary two-cycle motor, keeping the rubber connections level?

2—By using storage battery in connection with the Ford magneto could it not be used successfully for lighting the two head lights?

3—How would the wiring be and what size electric lamps?

4—How large a gas engine will pull the Deering 8-foot cut binder?—Reader.

1—It will not make any difference as long as the tank and connections remain at the same relative height.

2—The magneto in the model T car generates sufficient current to operate the two head lights, but it is not advisable to put any additional load upon it to take care of the tail lamp.

3—The magneto generates a voltage of 8 to 40 and for the electric lighting system two 10-candlepower bulbs wired in series is recommended. Owing to the difference in voltage between the magneto and a storage battery, the two could not well be combined for lighting. It is claimed that satisfactory lighting of the lamps has been obtained from the magneto by wiring it as shown in Fig. 1. A primary wire P is led from the magneto terminal T at the top of the flywheel housing to the primary terminals on the lamps L as indicated. A ground wire G connected to the ground terminals of the

lamps is then attached to some portion of the engine or car having a good metallic contact with the cylinders. The correct voltage of the lamps will be hard to determine. Eight-volt lamps were recommended by a correspondent, but it would seem that these would burn out when the motor, and therefore the magneto, were running at high speed, while if lamps of near the maximum voltage were used, they would give no light at low speeds.

4—A 15-horsepower gas tractor will pull and operate three 8-foot binders easily and will handle four under ordinary conditions. Gas tractors are not usually built in smaller sizes, as the economy of this form of traction comes from the ability to do a large amount of work at one operation. Where the binder is pulled by horses but operated by a gas motor, a 3-horsepower motor will suffice.

LIFE OF THE MOTOR CAR

St. Paul, Minn.—Editor Motor Age—Some time ago I saw an article in one of the motor papers fixing the real life of the motor car at 10 years. Now while it may be true that there are cars that will last only this length of time, or perhaps one-third of it, I must disagree with the writer inasmuch as I have proven to my satisfaction that the standard car over \$800 will last nearly 30 years if properly cared for and repaired when needed. Indeed, there is one maker who advertises in Motor Age who guarantees his car "for life," and this must mean at least 33 1-3 years, for this in the average life of the human being, generally speaking.

The constant advice in Motor Age from the editor and others, if followed, would, without any doubt whatever, add many years to the motor car's life, and put in the owner's pocket many a dollar with its buying qualities and pleasure. I have noticed at various times the great difference in the use of the car and marked in my mind the many errors of judgment in the one who drove the different cars. Tires will prove the opening statement, I really believe, for one man will get 10,000 or 15,000 miles out of a set that another would not get as many hundred. The whole secret is careless driving and care of the tires.

Of course I do not mean to say that every part of the car will last 30 years, but the great majority will, and with proper care and a few extras now and then, immediately when needed, will give your car a 30 years' lease of life, and longer in my opinion. Cars that are used by careful drivers or owners undoubtedly will outlast two or three times those driven by careless and inexperienced drivers, who had as soon run over a board lying in the road full of old nails as to run on a clearance of 4 or 5 inches to avoid this obstruction. And again, I have ridden with those who would be

much pleased to run out into a deep ditch in passing a team, thereby twisting their frame or chassis in a very bad manner, instead of waiting for a moment until the slow-moving vehicle could make room for them. They laughed right merrily at the evident displeasure which I manifested by such work, and promised to show me how to "make her 'yomp' over the next railroad crossing" if a team prevented them from keeping in the road. Such rough work most emphatically works havoc with engine, chassis and tires and is most fearfully expensive to the one who owns the car.

Cheap cars are dear at any price, so to speak, and I do not mean in this article to advocate the cheap one will last as long as the costly machine.

I saw several cars on the street today that were new cars and still they looked like ones which had been used 5 or 6 years—marred, scratched, dirty, wood-checked and paint-blistered, and at the end of the tour for sale at a great discount from the original price paid. My advice, if experience is any good from which to give advice, is to buy a good, standard car, and expect to pay a good, fair price for the same; then after you get it take care of it, as you would other valuable property, and I am sure you never will have an occasion to regret the purchase. I am as careful with my car as our piano, and am asked repeatedly if I have got another new one. Don't run it through mud and then let the mud dry on it, but get busy when the run is over and wash and polish it up, so when you want to use it again it will come out of its garage like a high-bred trotting horse—shining body, shining lamps and brass work, engine ready for any call upon it, and if this is steadily adhered to your car is safely on the 30 years' road, and not only this, but a genuine pleasure to use such a bright, shining piece of machinery.—A. D.

GASOLINE FIRE DEPARTMENTS

New Haven, Conn.—Editor Motor Age—Through the Readers' Clearing House I would like the following answered: Why is not the gasoline engine utilized for pumping water in the new New York fire engine? I should think the steam engine could be thus done away with and the motor car itself be much simplified. I have heard that the gasoline does not develop the required pressure. Is this right?—P. C. B.

Gasoline engines can be used for this work, but up to the present the makers have not made large enough motors; that is, the horsepower has not been great enough. It is particularly hard service on a gasoline motor in fire department work; in case a fire continues for 24 hours it will be necessary to keep the engine pumping steadily for that time. In this work the present engine would have to work at its utmost capacity and perhaps at beyond its capacity. With larger en-

gines it will be possible for the gasoline engine to operate a pump steadily for 36 hours or more. It is rather unfortunate that some of the builders of gasoline fire fighting apparatus have made this mistake of using too small a motor because it has given the impression more or less that the gasoline engine is not suited for the work, which is not the case at all. It is a certainty that the gasoline engine will soon supplant the steam engine in all fire department work in our big cities and in many of the smaller cities just as well.

REMEDY FOR DISHED WHEEL

Sumter, S. C.—Editor Motor Age—Regarding the method of repairing a dished wheel, recommended in the Readers' Clearing House for July 27, of pounding it with a sledge, is very dangerous, because if the wheel is not struck absolutely true, one or more of the spokes will be driven out of place, and, in fact, this method of dishing it back into shape breaks the ends off the spokes. I reached a very easy solution of the problem and for the benefit of those who may have wheels that are dished, submit same herewith.

The wheel, which is 34 by 3½, with demountable rim, was originally of the shape shown at left, Fig. 2. After the accident, the entire hub was pushed outwardly, as shown at right. The only thing it is necessary to do is to unshrink the iron rim, take off the wheel and hub flanges, turn the wooden part of the wheel around and shrink the rim back again.

The only difference this makes in the wheel is that the stripping will be on the inside. You cannot beat these wheels into shape. I put it under a hydraulic press

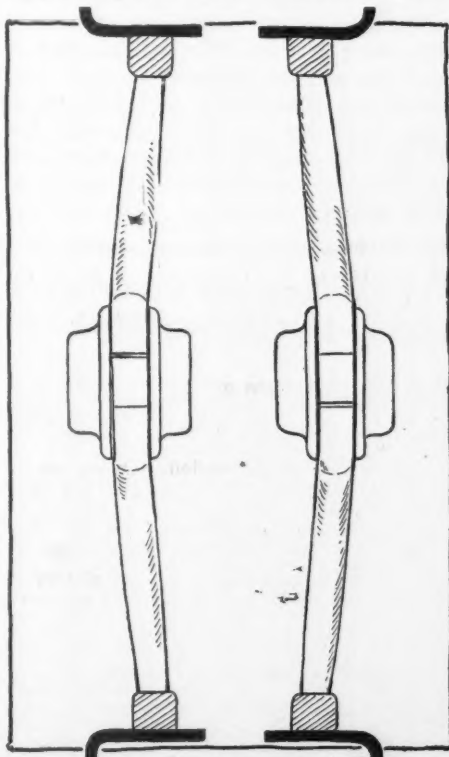


FIG. 2—REPAIR OF DISHED WHEEL

and tried to press it back, but it crushes the ends of the spokes and makes a bad job.—H. R. Van Derwater.

FOOLISH TIRE LAWS

Sauk Center, Minn.—Editor Motor Age—The Alexandria Motor Club and our local club gave notice in our last local paper that they would see that they had their rights of the laws relating to the public highways, and would enforce them at once. This is a step in the right direction, as we have been imposed upon long enough by those who ought to know better. Ploughing up the road, making a dumping ground of it for stones, brush, bottles and old boards full of nails, to say nothing of the road hog who makes us change our gear and then looks up so innocently as we pass by. The laws are very strict relating to obstructing the highways with any kind of material, and also refusing to give one-half of the road when overtaken by either a motor or carriage of any kind. A fine of from \$5 to \$50 with costs is possible. Let the good work go on.

About that tire law passed by our late lamented legislature. This is, to say the least, one of its many foolish bills passed without just consideration, and in the belief of aiding the motorist, when, in fact, he is injured by such an unwise law. I believe the law is not constitutional if tested. If it had left out the year and inserted the first and second quality clause instead it would not be so bad. Also if the practice of buffing off the name of the maker from tires sold had been forbidden it would have been some little advance, but as it is, no one is benefited and many injured by this law. For instance, if one has a car with tires almost new, and wishes to sell it he cannot do so except he takes off the old tires and put on new ones. Again if he has had a set, or one, two or three retreaded, the retreading would as a matter of fact obliterate the maker's name and year of manufacture, and preclude the sale of these tires or getting them repaired, as I understand the bill. And further those who had a lot of tires on hand were only given until July 1 to dispose of them, which in itself would make the bill unconstitutional in my opinion. However, this legislature did not forget to make sure of its pay and roll up about \$11,000,000 for the taxpayer to adjust. In hoc signo vinces, never.—A. D. Carpenter.

LATE SPARK HEATS

Chicago—Editor Motor Age—In the answer in the Readers' Clearing House of July 27 to a correspondent who signs himself Doc, and in an answer to a similar query in the issue of July 20 Motor Age suggests that the correspondent's overheating difficulty may be due to a too rich mixture. My observation has been that an overrich mixture is not likely to cause serious overheating. Possibly their trouble is due to a late spark.—S. D. Krischl.

DID you ever come in from a run with the car spattered with mud and smeared with oil and grease, and wonder if it ever would again have that bright, shiny appearance it possessed when it first came out of the sales room? No one is more careful about the appearance of his car than the new owner. He wants to keep it looking as spick and span as when it was first delivered to him. Oftentimes the finish was one of the determining factors in his choice of the car, and if the finish is destroyed either by the dirt and grease accumulated in use or by the methods employed in removing them, he feels he has been cheated to some extent. The polished surfaces of a motor car are the parts that appeal to the eye. Their appearance and preservation are of utmost importance to every motorist.

Few people really appreciate the time and labor required to build up the high polish of the body. It takes from fifteen to twenty coats of paint and varnish, and each coat has to be allowed time to dry and must be rubbed down before another is put on. That means that it takes weeks before the job is finished. So it really is a crime to clean it by a means that is injurious to the finish.

There is a great difference of opinion as to how the washing of the car should be done, but all authorities agree upon one thing, and that is the plentiful use of clear water as the first step. Clear water will wash off dust, dirt and mud, but it will not touch the grease or oil and leaves the car with a dull, dingy, streaked, lusterless appearance. The much too common practice of using gasoline or kerosene is a bad one, as it is very apt to injure the finish of the car. Gasoline certainly will cut the grease and would be very effective if it would only stop there, but it cuts the finish, too.

Most people agree that the proper way of cleaning a car is to use a neutral soap made expressly for washing painted and polished surfaces. What prejudice that has existed in the minds of car owners against the use of soap on a motor car probably is due more to the misuse of

Keeping Up the Shine

Hints from Soap Makers

soap rather than to soap itself. By misuse is meant the improper use of the right soap. Some car owners, without giving the matter any thought, will use common laundry soap—a sure way to destroy the finish of the car. Some even have been known to use toilet soaps, thinking this was best adapted to the needs of the car.

It is true that the question of motor car soap has not received until recently the attention it deserves from the soap manufacturers. Motor car soaps, however, now have a fixed place in the field and are being made a specialty by some soap manufacturers. The advent of the motor car has necessitated the manufacture of a soap especially adapted to the washing of painted and polished surfaces.

The right soap to use is one that is made expressly for motor car use. It is a neutral soap having those properties that are needed to cleanse thoroughly and at the same time leave a finish in good condition. The proper soap will not only restore the luster, but will act as a preservative to the finish, giving it life and preventing checking or cracking.

In selecting a cleanser for a motor car, most authorities advise the choosing of a pure potash and oil soap. It makes little difference whether the soap is soft or hard, although it generally is believed that the hard soaps are more liable to be either semi-potash or soda soaps. Avoid the cheap in price, if you think well of your pocketbook, as cheap soaps very often are adulterated, and adulterated soap must have a binder to hold the adulterates and the soap together, and that binder is usually soda. Even a pure soda soap has a dulling effect upon the

varnish, while a pure potash soap gives brilliancy and permits a high polish. The soap should be as free from alkali as is possible, and the presence of excess alkali in an oil soap may be detected by touching the tongue to it. If there is a sharp taste it may be taken that the soap is too strong for motor car use. If it does not contain a small percentage of free alkali it is very liable to contain free fat, which, of course, reduces its value as a cleansing property. The only objection to using a soft soap is that, as a general rule, the softer the soap the more water is paid for by the purchaser.

There is a wrong way to use even the right kind of soap. The wrong way is to smear the raw soap over the surface of the car or to work it into a sponge and then dip the sponge into water to make a suds. That way is not economical. It wastes soap and is apt to leave particles adhering to the surface which will give the car a streaked and smeary appearance and soften the varnish. The right way to use soap on a motor car is to dissolve in a pail of water enough soap to make a good suds and then use that suds for washing purposes. With most kinds of soap, the best method is to dissolve about a handful in a pail of cold or tepid water.

Before applying a suds, rinse the car well with a stiff stream of water from the hose, so as to loosen up all the dust and dirt in order to prevent scratching the surface. This not only loosens the mud which has become hardened, but reduces the probability of scratching the varnish when washing with a sponge. Then, with a clean sponge, apply a heavy suds, especially to those parts which are

Owners Need Educating

Dayton, O.—Editor Motor Age—We know by the letters we receive from car owners all over the country that there is a woeful lack of information on the subject of properly caring for the cars so as to have them always looking nice and clean and so as to preserve the life of the finish. These are questions of common interest to the motoring public. The ignorance on the question of how to wash a motor car resulted in sending many cars on premature trips to the paint shop.

The polished surfaces of a motor car are the parts that appeal to the eye. Their appearance and preservation are of the utmost importance to every owner or chauffeur. A spick and span car adds greatly to the joy of motoring. Therefore, great care should be used in washing the body of a car.

We find some car owners using gasoline and benzine—a sure way to fill the finish. Others throw up their hands in horror at the idea of using soap on polished surfaces. They simply don't know that soap is made especially adapted for that particular use. Others will use soap that is very strong with alkali. Some think they ought to use castile soap while we find others using common laundry rosin soap—one of the worst things they can do. We run across all kinds of strange ideas. One man was using ammonia, another coal oil, and we

Good Advice from the Soap Makers

even found one car owner who put carbonate of soda in the pail of water and used that water to wash his car. We asked him why he did it and he said to break the water so that the acids in the water wouldn't eat the paint.

Clear water will wash off dust, dirt and mud, but it doesn't touch the grease or oil that gets smeared or spattered on the car in numerous ways, and leaves the car with a dull, dingy, streaked, lusterless appearance. The much too common practice of using gasoline or kerosene is a bad one as it is apt to injure the finish of the car. Gasoline certainly will cut the grease and it would be all right if it would only stop there, but it doesn't—it cuts the finish, too. The proper way is to use a neutral linseed oil soap and then in using soap, there is a right and a wrong way.

The question of motor car soap has not, until recently, received from the soap manufacturer the attention it deserves. Motor car soap now has a fixed place in the soap field and is being made a specialty by some soap manufacturers. The advent of the motor car has necessitated the manufacture of a soap especially adapted to

washing painted and highly polished surfaces.

There is a right and a wrong soap to use and a right and a wrong way to wash a car. The right soap is one that is made expressly for auto use. It is a neutral soap containing those properties that are needed to cleanse thoroughly and at the same time leave the finish in nice condition.

There is a wrong way to use even the right kind of soap. The wrong way is to smear the raw soap over the surface of the car or to work the raw soap into a sponge and then dip the sponge in water to make a suds. That is the wrong way. That way is not economical. It wastes soap and is apt to leave particles of soap adhering to the surface which will give the car a smeary, streaked appearance.

The right way to use soap on a motor car is to dissolve in a pail of water enough soap to make a good suds and then use that suds for washing purposes. First use the hose on all varnished surfaces so as to loosen up all the dust and dirt which should be washed off thoroughly before using the sponge, in order to prevent scratching the surface. Then with a clean sponge, apply a heavy suds, especially to those parts that are greasy and oily. Rinse off at once with clear water, using a hose or clean sponge and wipe dry with chamols or cheese-cloth.

Never use for sudsing the same sponge used

Preservation of Paint

Ways of Maintaining Polish

greasy and oily; rinse off at once with clear water and a fresh sponge and wipe dry with chamois skin or cheese cloth. With some soaps, if the varnish surfaces are thoroughly washed and rinsed with cold water, the use of chamois skin is not necessary. Never use for a washing with soap the same sponge that has been employed for washing off the dust and dirt; never use hot water on the painted or polished surfaces. Cold water is preferred, but it may be just warm enough to have the chill taken off. Do not be afraid to use plenty of water. Remember that any soap is liable to injure a highly polished surface, but it will not do so if the parts are cleansed thoroughly with clear water after the soap is used.

It often is found with some soaps that drying with a woolen cloth is preferable to the use of either chamois or cheese cloth, as it sometimes gives a higher luster. If the gearing, axles and wheels are very oily and greasy, use a heavier suds and more rubbing, and it is sometimes necessary to use a brush on these parts. The hose can be used to advantage for rinsing after washing with soap.

Most manufacturers of motor car soap advise against applying any other polish after the final drying. They saw that furniture polish and the like is very apt to contain oil or turpentine, or both, which dissolves the coach finish, dulls it and tends to leave a thin skin or coating which covers up the original polish. Other soap manufacturers recommend the use of first class body polish oil which is supplied by various oil manufacturers. A light coating of this oil is rubbed over the body and then wiped off by the use

of a soft cloth. The latter authorities say that the advantage of applying the oil is that afterwards the dirt does not stick to the car as it would otherwise, and if the oil is used it will not be necessary to use soap again for some time, as most of the dirt and dust may be removed by a duster. It is, of course, necessary under any conditions to use soap regularly on the running gears to remove the accumulations of oil and grease. Some authorities advise against the use of soap at all, believing that the polishes do the work as well and are less harmful.

One problem that motor car owners have had to contend with within the last few years has been the oiling and asphaltting of streets. A car that is driven over a freshly coated road is bound to become spattered with oil or asphalt. The oil can be easily removed by washing with soap as indicated above, but the asphalt should be immediately removed while it is fresh. If it is once allowed to harden nothing can take it off unless taking the finish off with it. The use of soap while the asphalt is fresh nearly always will remove it.

The instructions foregoing are intended primarily for the private owner of a car. For cleaning the cars in public garages or where a number of them are to be cleaned regularly the procedure is practically the same, but the soap may be handled a little differently. A convenient way is to first make a liquid soap by dissolving about 10 pounds of soap to 50 gallons of water. Then use that liquid soap in sufficient water to make a good suds. If a strong soap is necessary, a good soap stock emulsion can be made by boiling for

half an hour or more 1 pound of potash soap in 3 gallons of water. This can be applied directly with safety. Those fortunate enough to have live steam at hand can make four barrels of good soap jelly out of 1 barrel of soap by boiling it in three parts of water to one part of soap. This will make an emulsion soap for rapid work.

The leather upholstery of the car can be cleaned with soap or other cleaner in practically the same way as the body. A good soap will dissolve the dirt, dust and stains on the leather without affecting its natural oil. After washing with the suds remove the lather with a sponge well rinsed and moderately wet, then rub the leather to a natural finish with a dry chamois or flannel. Just as some recommend woolen cloth for body polish they also recommend woolen cloth for drying and polishing the leather.

With cars that are upholstered in plush or velvet such as limousine cars, probably the only way to clean them thoroughly is by means of a vacuum cleaner, although a whisk broom usually suffices.

For polishing the metal work it is best to use a metal polish that is free from acid and one that will work quickly and at the same time hold the polish in damp weather. Care should be taken in selecting a polish that it does not spot the finish of the body as it is splashed on it. An acid polish will not only eat the plating on the metal but will also destroy the body finish. If the polish is very gritty it is very apt to do more harm than good in that the hard, coarse particles will scratch the surface of the metal. Some of the quickest polishes are the most harmful as they may contain a high percentage of free acid.

There is such a wide divergence of opinion among the manufacturers of cleaning preparations as to the best material and method of use that it was thought best to allow them to state their beliefs in their own way. The communications that appear below are in answer to a request for the proper materials to use and the right way to shine up the car.

for washing off the dust and dirt. Never use hot water on any painted or polished surface. Cold water is preferred, but it may be just warm enough to have the chill taken off—no warmer. If the gearing, axles and wheels are very oily and greasy, use a heavy suds, giving an extra rub and rinse well with clear water.

One problem that car owners have had to contend with considerably within the last few years has been the oiling and asphaltting of roads. A car driving over a freshly coated road is bound to become spattered with oil or asphalt.

The oil can be easily removed by washing with soap as above indicated, but never allow asphalt or road composition to harden on your car. Take it off while it is fresh. If it is once allowed to harden then nothing can take it off without taking the finish along with it. Wash the car with soap while the asphalt is fresh.

The car owner who will follow these instructions will always have a nice looking car and the life of the finish will be prolonged.—J. P. Davies Co.

Soap and the Washing

Chicago—Editor Motor Age—For the safe and economical washing of motor cars the essential thing are tools to do the work—the soap and the washer.

Soaps have had a long and varied life. They

Hints of Benefit to Owners and Garage Men

have been made for over 600 years. The great manufacturing industries which have to use soaps and the laundries have long ago learned to buy only the all-pure soap of high quality for the sake of economy and fine cleaning value.

Choose an all-pure potash and oil soap—soft—in preference to soda soaps—hard—or the semi-potash and soda soap. Avoid the cheap adulterated soap if you think well of your pocketbook. An adulterated soap must have a binder to hold the adulterant and soap together and that binder usually is soda. Even a pure soda soap gives a dulling effect to varnish, while a pure potash soap gives brilliancy and allows a high polish.

Choose a washer that is willing to learn. Apply the commission form of government, put the soap under lock and key and hand the key to the head washer. Hold him alone responsible and, when washing cars, bear these points in mind:

The soap should be entirely dissolved in water at least 6 hours before using for the greatest efficiency, safety and economy. Just

enough of this dissolved soap should be put in the pail to make good suds.

Wet the car thoroughly with clean water before applying soap suds. Soap suds on dry, dusty car leaves it streaked. If for any reason a strong soap is necessary, make a soap stock emulsion by boiling for half an hour or more 1 pound of potash soap in 3 gallons of water.

A high grade potash soap requires only from 4 to 6 pounds—according to hardness of water—to each 50 gallons to make good strong suds. Rinse the suds off thoroughly and dry with damp cloth or chamois. After the car is dry it will take a high polish with very little rubbing. Those fortunate enough to have live steam can make four barrels of good jelly or creamy soap out of one barrel of the soap by boiling in three parts water one part soap. This will make your emulsion soap for quick and rapid work. A pure soap cleanses by emulsion—the softest way—an adulterated soap cleanses by saponification and emulsion—if soda is used as a binder.—Wilbur M. Kelso, manager, Monahan Antiseptic Co.

Selection of the Soap

Worcester, Mass.—Editor Motor Age—In regard to soaps and polishes for cleaning motor car bodies, we advise first of all selecting a soap made by a reputable manufacturer and as free from alkali as is possible. The presence

of excess alkali in an oil soap for cleaning motor cars may be detected by touching the tongue to a sample of the soap and if there is any sharp taste whatever the soap is too strong for motor car use.

After selecting a good soap, the best method of utilizing it is to dissolve a small handful of the soap in a pail of water—well made oil soap will quickly dissolve in cold water. Then use the solution in cleaning the car. First, however, wash off all the dirt possible with the use of the hose. After cleaning the car, use the hose to wash off all remaining soap and dirt and dry with chamols or cheesecloth.

If desired, after the body is cleaned and dried take a soft cloth moistened with a little first-class body polish oil which is supplied by various oil manufacturers and rub a light coating of this oil over the body and then wipe off all the oil possible by the use of another clean soft cloth.

The advantage of applying the oil is that afterwards the dirt does not stick to the car as it will otherwise and if the oil is used, it will not be necessary to use soap again for a long time and most of the dirt and dust may be removed by a duster. It is, of course, necessary to use soap regularly on the running gear to remove the accumulations of oil and grease.—H. P. Bagley, president and treasurer, White & Bagley Co.

Many Grades on Market

Chicago—Editor Motor Age—The selection of soap for washing motor cars is of great importance, inasmuch as there are so many grades on the market that do not run uniform in quality. Buyers should select the soap made by a reputable manufacturer who understands how to saponify fats and has the equipment for making soap properly.

Soap should be as nearly neutral as possible; in other words, it should contain only a small percentage of free alkali. If it does not contain a small percentage of free alkali it must contain free fat, which, of course, reduces the value as a cleansing property. It should be fairly hard, otherwise, the purchaser pays for water instead of soap.

For cleaning the wood-work on motor cars it is first necessary to make a good suds with soap and water, warm preferred. Some people do this by placing a quantity of water and soap in a receptacle and allowing it to thoroughly dissolve. Others rub a wet sponge over the soap in its original package. The preferable way in our experience is to dissolve the soap, as first suggested, applying with a sponge or soft cloth.

After applying the soap, cleanse the parts thoroughly with clear water. Do not be afraid to use plenty of water. Remember that any soap is liable to injure a highly polished surface, but it will not do so if the parts are cleansed thoroughly with clear water after the soap is used. After the surface is thoroughly washed, rub dry with a woolen cloth. This leaves the car with its original luster.

To cut grease from the hubs, it sometimes is necessary to use a brush and apply more soap. The soap can be used without fear on the polish or leather, if the above directions are followed out.—E. J. Crabbs, sales department, James S. Kirk & Co.

Cleaning the Car

Rome, N. Y.—Editor Motor Age—The best instructions we can give for taking care of the car are as follows:

First rinse the car well with a stiff stream of water from a hose, taking off all the loose particles of dirt. This precaution always should be taken as it not only loosens the mud that has become hardened, but reduces the possibility of scratching the varnish when washing with a sponge. Then put a handful of a good motor car soap, one that does not contain a free alkali, in a pail and turn on a stiff stream of water either lukewarm or cold. Use this solution in washing the entire varnished surface. When all parts have been thoroughly washed, rinse well with cold water. The use of chamols is not necessary if the car is thoroughly washed and rinsed.

In polishing, care always should be taken not to apply the polish in too large quantities, as it will run in the creases and seams, where it is hard for the polisher to remove it. Always use a soft cloth in applying and removing the polish. Liquid forms of polishes are most satisfactory, as they do not contain coarse particles which are liable to scratch the finish.

In regard to cleaning the upholstery of the car, we have had no experience in this line, except in caring for our own cars, however we would suggest where the cars are upholstered in plush or velvet, such as limousine cars, the best way to clean them is to use a vacuum cleaner.—Rome Soap Mfg. Co.

Hints About Soap and Washing

Sheboygan, Wis.—Editor Motor Age—In washing a motor car, first rinse the car thoroughly with cold water so as to dissolve all the dust and mud that may have accumulated on the car. If there should be any grease spots on the body we would advise making a light suds, using only a semi-liquid vegetable oil soap, for the reason that it dissolves easily in cold

water and will not leave any lumps, which otherwise might stick to the chamols and streak the body. Furthermore, a semi-liquid vegetable oil soap can be easily rinsed off and will not dull the varnish.

For the gearing make good strong suds and soak up the greasy parts thoroughly with a sponge, then rinse off with clear water and the grease will be entirely removed. One should not use the same chamols for the gearing as is employed for the body.

The upholstery also can be cleaned by making a light suds of a semi-liquid vegetable oil soap, which will remove all dirt and grease and at the same time will soften the leather. After washing it thoroughly use a soft woolen cloth to dry it and the leather will have a nice luster.

For polishing the metal work we would recommend a metal polish that is free from acids and that will work quickly and at the same time hold the polish pretty well in damp and foggy weather.—M. J. Heronimus, secretary, Rexine Co.

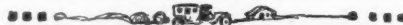
Four Things Necessary

Cincinnati, O.—Editor Motor Age—In cleaning a motor car four things are necessary—a neutral soap, liberal supply of water, a soft wool sponge and a chamols.

A flow of water first should be allowed to apply over the body and gearing of the car to remove any loose particles of grit or dirt. A solution of the neutral soap then is made in a pail, enough soap being used to a given quantity of water such that the solution will lather freely. This then is applied to the surface and it should remove any grit or dirt without injuring the varnish or luster. The car is then thoroughly rinsed and dried with the chamols. It should then look like new.—Heinrich Fischer, Heinrich Fischer & Co.

Car Bodies Often Ruined

Chicago—Editor Motor Age—In our experience, we have found that car owners, because of using inferior polishes which had been recklessly misrepresented, had ruined car bodies, be-



WORKING ON TEXAS ROUTE

Corpus Christi, Texas, Aug. 19—Steps have been taken which assure the early completion of the proposed highway between Corpus Christi and San Antonio, a distance of 140 miles. The counties and towns through which the San Antonio to the gulf road, as it is called, will pass, have joined actively in the movement and several counties have started to grade their portion of the route. It is stated by the committee of the Bexar County Highway League, which has just made the trip over the route from San Antonio to Corpus Christi, that the road will be practically completed in 5 months, with the exception of a stretch across Wilson and Karnes counties, putting in operation nearly 100 miles of road.

The road will be built 40 and 60 feet wide for the entire route and will make one of the finest motor highways in the state. It is stated that cars will be able to make the run from San Antonio to this place in 5 hours.

The route of the road as selected by the committee from San Antonio is through the towns of Floresville, Karnes City, Kenedy, Beeville, Skidmore, Gregory and thence to Corpus Christi. Nueces county is now grading that portion between the Neuces river and Corpus Christi. This will be a 60-foot shelled road. Nueces and San Patricio counties are to unite in building a bridge across the Nueces river. San Patricio county will also grade its portion of the road. Bee county has voted the necessary bonds and will start work in the near future. W. S. Hawkins, highway engineer of the Bexar County Highway League, will have general direction of the route.

came prejudiced against using any polish. It therefore is necessary to prove to them the advisability of using a good, reputable polish, in order to preserve the life of the finish and properly care for it.

Some car owners use soaps, kerosene and other injurious substances, but they only temporarily serve the purpose and by continuing the use of such substances, the finish will be ruined in a short while. They cause cracking and checking by absorbing the very essence of the finish. This compels repainting of the car at considerable expense, and while the car is being painted the owner is deprived of its use.

A polish which is specially prepared for use on motor car bodies, when used, will shield and protect the finish from the climatic changes.

The proper use of a polish protects the body from these effects of sun and rain. It shields it from the sun's rays by reflecting them off the surface of the polish. Moisture caused by rain, evaporates off of the surface and leaves no marks on the body, which result if no polish is used.

Owners desiring to store their cars for the winter, or who store them while away on vacations, should see that the car receives a good free application of polish, the leather as well as the body, and the polish allowed to remain on the body during the entire time the car is stored, without wiping the polish dry. This prevents frost from attacking the finish, which checks, spots and cracks the finish. This will obviate the necessity of repainting the car when taken out of storage.

After taking out the car for use, the body first should be washed with cold water and soap—not rough soap—then showered with cold water, wiped with a soft cloth and then wiped dry with a chamols cloth. This removes the old coat of polish which has accumulated the dust and leaves the original finish intact. The car then is ready for polishing in the usual manner. The results obtained will be surprising.—Weiss Polish Works.

Washing Varnished Surfaces

Rome, N. Y.—Editor Motor Age—The washing of the varnished surfaces of cars must be done very carefully. To insure proper results, only especially prepared soaps, made by competent manufacturers should be used. The bucket or pail and the sponge which is used, should be free from grease and dirt accumulated from the floor or tools.

Any grit or mud on the varnish first should be rinsed off with a stiff stream from a hose. Do not rub with the sponge or cloth until the mud has been removed, as it will scratch the varnish. After the outer coating of mud has been removed, put a small handful of good soap into a pail, half filled with water and stir with a stick until an abundant lather is created.

The water now is made soft and soapy. Go over the varnished surface and running parts with the sponge. This will remove all grease and oil without hurting the varnish. Immediately rinse off the lather with a hose or the soap instead of the soap itself as much as possible, as much cleaner and more satisfactory results are obtained. Soaps that are not properly made and neutralized will streak the varnish and dull it, without removing the grease and dirt from the varnish. After the soap is thoroughly rinsed off, the body then will dry without streaking.

Unsatisfactory results are obtained in not using metal polishes properly. In the first place a good metal polish is a very delicate article, as it is made most carefully by the mechanical and chemical combination of materials.

There are metal polishes which are known as non-settling polishes, but it is better to shake these up before using, as better results are obtained, especially where they have stood for some time. This enables the ingredients in the polish to come in proper proportion when used. Be sure the cloth which you use is clean and free from oil and grease. Any soft cloth will answer.

When applying the polish cover the surface evenly and plentifully so the chemical combination may help and it will do the work itself. A minute or so later you can go over the surface and with light rubbing obtain the same results, whereas if the polish is immediately rubbed off, much of the luster is lost.—Baum's Castorine Co.

Use the Best Soap

Philadelphia, Pa.—Editor Motor Age—Concerning the cleaning of motor cars, we always have felt that owners should use the best soap the market affords. Whether the products are ours, or those of other manufacturers, they should be absolutely neutral, so as not to injure the varnish in the least, of a highly finished car. Furthermore, the quantity consumed of a cleaner, as well as metal polish, is so small in a year that from a financial standpoint no good reason could be advanced for using anything but the best, the initial cost of which may be high, per pound or gallon, but as the quantity to be used is so small that it does not pay to use cheap substitutes, which enables the man doing the cleaning to do the work quickly, with a strong probability that the varnish will be affected thereby.

The use of neutral motor car cleaner and neutral soap, with neutral metal polish, will increase the period between shoppings about 50 per cent.

We would suggest that a car be cleaned once a month with a cleaner, applied with waste, and rubbed and wiped dry with waste. The metal should be polished with a metal polish in paste form, which saves all the drippings. The cost of cleaner, metal polish and waste for this monthly cleaning would be about 35 cents. In the interim, if the car is muddy, the mud should be removed with hose and water, or sponge and water, then a soft soap, applied with waste and wiped dry with waste, and the metal polish applied, as may be necessary. The cost of this oil soap, metal polish and waste, used in this second cleaning, should not exceed 15 cents. As to labor, it should not require over 1½ hours for the monthly cleaning, or more than 1 hour for the intermediate cleaning.—Henry Rower, Pres., Idealo Co.

Properties of Soap

Detroit—Editor Motor Age—In washing a highly varnished surface it is essential that the proper agents should be used. Alkalies of all kinds are injurious to any varnishes or painted surfaces, the owner therefore should make sure that the soap or washing powder used contains no free alkali.

Inasmuch as paint and varnish both contain linseed oil, therefore a soap made from linseed oil would be most satisfactory. A test for free alkali may be made by dropping a few drops of phenolphthalein on the soap, if alkali is present in a free form, it will then turn to a red or carmine color.—Detroit White Lead Works.

Use Special Cleaner

Philadelphia, Pa.—Editor Motor Age—You can keep the body of your car as good looking as it was on the day you bought it. Just avoid doing some things—and use a special motor car cleaner. Don't use soaps, oils, metal or ordinary furniture polish. They are not made for or intended to be used on your motor car. Often such articles contain acids or alkali which will dull the gloss and injure or discolor the finish. In metal polishes there is liable to be grit which scratches and mars the gloss. Ordinary furniture polish and oils leave a sticky surface which quickly gathers dust.

When the car is dusty don't rub it with either a dry or damp cloth or chamols skin. Scratches would be the result. The quills of a feather duster also would scratch the finish. Remove all fine, loose dirt with a wool duster.

Dry or wet mud and dirt always should be entirely rinsed off with clean water, and not dampened and rubbed off. A little soaking with water and a sponge will soften and remove the mud that won't come off at once.

Use the cleaner when all the dust, dirt and mud has been removed. Make sure that the surface is dry—if damp or wet wipe dry with a soft, dry chamols skin.—John Lucas & Co.

Using Cream Polish

Chicago—Editor Motor Age—It has been the writer's experience that if the metallic parts are well polished with a good cream polish at the beginning of the season, it requires only an occasional wiping with a cloth or waste, slightly moistened with this polish and then rubbed dry. This prevents getting sediment in the grooves, takes very little time, and the lamps, radiators, etc., always have that new appearance.—Armiger Chemical Co.

Getting Off the Mud

Milwaukee, Wis.—Editor Motor Age—In washing a motor car first soften the dried mud with a gentle flow of water. A hose if convenient is just the thing. A stream with too much force will drive the grit into the varnish and scratch it. After all the mud is loosened, take a good sized sponge, and saturate it with soapsuds, using a good linseed oil soap.

Wash as large a space as convenient, moving the sponge in straight strokes, then use clear fresh water and gently rinse off the suds. Repeat the process until the body of the car is washed. Now wash the running gear. If there is any grease on the surface, kerosene used on another sponge will readily remove this grease, and is harmless in its effect. It is advisable to give the car another rinsing, going lightly over the body with a clean chamols skin.

The bonnet, which becomes fairly hot after a long trip, should be immediately sponged off upon returning from a trip through the rain. The rain spots can be removed by rubbing with a soft cloth dipped in boiled linseed oil, until they disappear. Remove the superfluous oil with a soft cloth.

The parts now being thoroughly cleaned, an inspection of the finish reveals the fact the new sensitive finish is greatly marred by thousands of fine hairlike scratches caused by flying dust and sand. Unless properly attended to, these fine scratches will shortly cause the finish to assume a dull, faded and unattractive appearance. The effect and changes of weather to which the finish is exposed, together with flying dust and sand when en route, sap up the vitality of the varnish, which if not given a

stimulant occasionally, will cause the surface to check and crack. This can be prevented by the use of a good body dressing, which also may be used to brighten up the leather parts of the car.—Aquila Chemical Co.

Care of the Car

Newark, N. J.—Editor Motor Age—Each time a motor car is run out it should on return to the garage be thoroughly washed off with water to remove all mud and dirt, for if allowed to stand without washing and the mud allowed to dry on the varnished surfaces it will cause the varnish to lose its luster. An occasional application of a good cleaner after washing with water will keep the varnish of both body and gears in fine condition. The cleaner should be applied, using a piece of soft chamols skin, rubbing it on thoroughly and then wiping off with clean chamols.—Clarence Brooks & Co.

Maintaining the Luster

Rochester, N. Y.—Editor Motor Age—To wash the body of a motor car and retain its original luster, take the best oil soap you can buy; make a solution of it by putting a few pounds into a pail of warm or hot water till you have about the consistency of thin jelly. Then take a pail of water and pour into it a cupful or two of this solution and proceed with washing in the regular way. In this way, all soap in your washing pail is thoroughly dissolved and you are getting all the value of the soap you are using, and the water has the same soap value when you start washing as when you finish, thereby giving your car an even wash.

Another thing to be considered is that you are sure of leaving no undissolved soap on the body of your car. Most washers are careless, especially those in garages, where time is an element, and it is essential that you arrange your materials so no possible harm can be done; and with a good oil soap, the most ignorant or careless cannot do harm to the most highly polished surface. This is the most economical as well as the safest way to wash your car.

To clean and polish the metal trimmings,



CENTRAL ROUTE SELECTED

St. Louis, Mo., Aug. 21—The central route, which follows in a general way the old Boone's Lick road and the Santa Fe trail, has been designated the official Missouri state highway by the State Board of Agriculture, on condition that satisfactory progress is indicated in the improvement of the roads within the next few weeks. Governor Hadley and members of the Automobile Club of St. Louis recently made a motor car trip over the road selected in an effort to choose a state highway. The southern and the northern routes also had many advocates. The road is to be opened with appropriate ceremonies, including a motor tour, about October 15, according to present plans.

The central route was selected because, in the opinion of the board, its advocates had complied more fully with the conditions laid down than the others. The route, which is from St. Louis to Kansas City, will run from the former city through St. Charles, St. Peters, O'Fallon, Wentzville, Foristel, Wright City, Warrenton, Jonesburg, High Hill, New Florence, Danville, Mineola, Williamsburg, Fulton, Millersburg, Columbia, Midway, Rocheport, Fayette, Glasgow, Gilliam, Slater, Marshall, Blosser, Malta Bend, Grand Pass, Waverly, Hodge, Dover, Lexington, Levasey, Buckner, Independence, thence to Kansas City. The route from Rocheport to Marshall by way of Glasgow is conditional.

Boonville desired to be included in the highway, and filed pledges to build a road across Cooper county. The route will be changed to include Boonville unless the more direct road is quickly put into the best of shape.

take a polish which will not harm the polished body of your car, the leather or rubber. A liquid polish that cleans by deoxidation instead of abrasion is the best. Simply apply the polish, going over all the metals on the car; then take a clean cloth or brush and wipe or brush off the substances left by the action of the liquid polish on the tarnish. The metal will be as clean and highly polished as when new and the work done in a few minutes. A liquid polish which requires rubbing to clean and polish metals, contains a powder to eradicate the tarnish, and if a microscope were used to examine the metal after being pronounced cleaned and polished, one would note the streaks of tarnish marks left on the metal which are invisible to the naked eye. However, it being there, tarnish will come again more quickly, and your metal requires more frequent cleaning. For that reason, we recommend one that cleans by deoxidation instead of abrasion.—Puritan Soap Co.

Be Careful of Varnish

Philadelphia, Pa.—Editor Motor Age—In giving the fastidious owner of a motor car information as to how to keep the body looking like new, we would suggest leaving out the use of soap of any kind on the highly varnished body. All soaps contain alkali in more or less degree, and alkali destroys the luster of varnish. To bring out the luster of varnish after it has been dulled by usage or to keep the life in the new varnish, use a good body polish made particularly for the purpose. Such polish removes grease, scratches and mud spots where cars are not abused. It has been known to keep the varnish in good condition and bright 3 years with the car in constant use.—Noxal Polish Mfg. Co.

Process Is Given

New York—Editor Motor Age—We have found from experience that the most satisfactory results are obtained by employing the following process:

Carefully wipe off all dust or mud from the surface of the metal parts, and if it is clay, oil, grease or some foreign substance which adheres to the surface, wash with warm water or gasoline. Then dry thoroughly with a soft cloth and apply a good metal polish. Rub this well into the surface of the metal part and polish with a piece of chamols or flannel.

By using this method two or three times a week, the lamps, steering rod, robe and foot rails, door-handles and all other metal surfaces of the car can be maintained in first-class condition and retain their luster and attractive appearance at all times.—H. W. Johns-Manville Co.

Recipe from Cleveland

Cleveland, O.—Editor Motor Age—Preparations made from a linseed oil base and intended for the washing of highly finished wood or metal surfaces are being used very extensively by motor car owners and garages for the washing of car bodies, running gears, etc. Some of these preparations are very meritorious. These are light amber in color, semi-transparent and will dissolve readily in warm or tepid water. They should contain a very small amount of alkali, or in other words should have just enough to cause saponification. More than this amount would be ruinous to any highly finished surface when used constantly.

Some products classed as linseed oil soap are very dark, denoting the presence of considerable rosin and should be avoided. However, there are enough first-class products of this kind offered for sale to assure everybody of their requirements, but it would be well that before purchasing material of this nature to make sure that its characteristics are clearly defined.—Atlantic Refining Co.

Killing the Luster

Minneapolis, Minn.—Editor Motor Age—One can easily realize that soap and water often applied with hard rubbing of the chamols and sponge to remove oil and grease from a motor car body soon will kill the luster of the varnish.

Certain acids and oils used in many polishes will injure the varnish used on cars. Some polishes contain oils that are not harmful to the varnish, but can not be readily rubbed from the surface, and therefore gather dust, then dry, leaving a rough, scaly surface, and killing the luster of the varnish.

Motor car varnishes are made of the finest grade of gums and oils, well seasoned. These varnishes are very sensitive, but stand the dampness and weather better than the cheaper varnishes, which are commonly used on furniture. Certain polishes can be used on furniture, giving good results, which would harm the varnish used on motor cars.

The best polish is one especially prepared for the fine sensitive varnish used on motor cars, which will not injure, but clean off all oil, grease and dirt, and bring out the original luster. The application is simple, and requires but little rubbing, because what polish is not rubbed off will dry quickly, and leave a clean bright surface, to which dust will not stick. The leather upholstery and top can be much improved by the use of an enamel dressing.—Rie Nie Mfg. Co.

Refinements in Stevens-Duryea Model AA

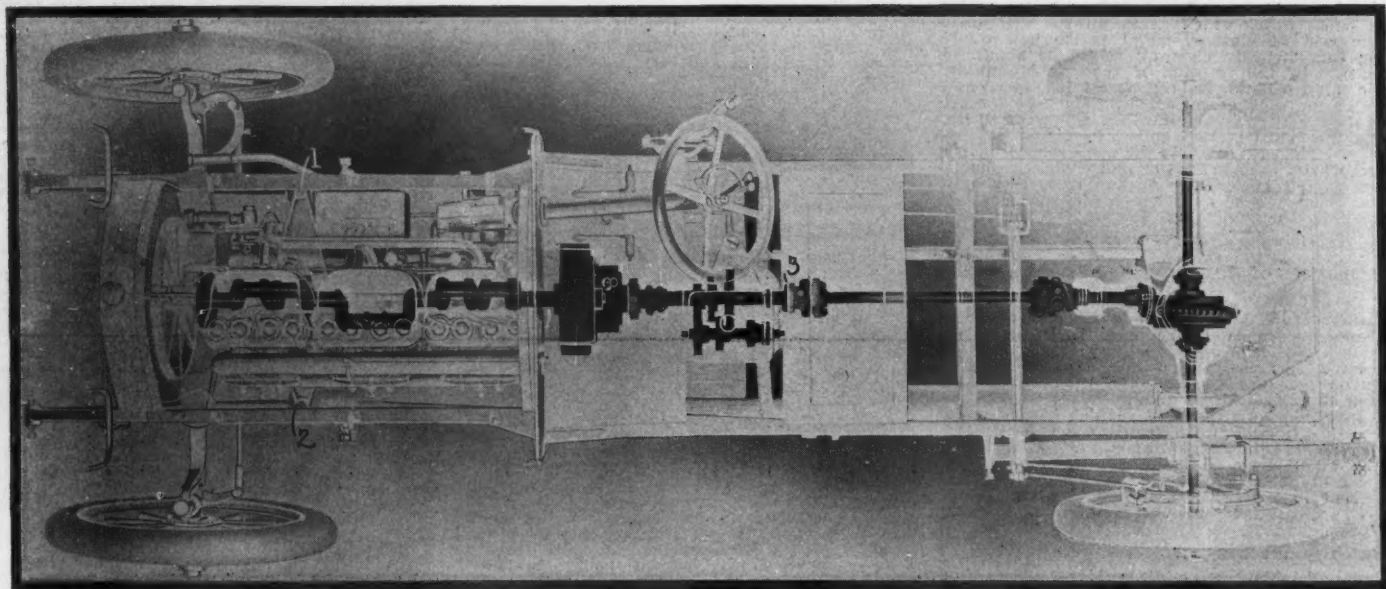


Fig. 1—Phantom View of the Chassis of the Stevens-Duryea Model AA for 1912. Illustrating the Features of Unit Power Plant Construction Supported at Three Points (1, 2 and 3), and the Straight-Line Drive from the Six-Cylinder Motor Through Square and Taper Square Connections and the Bevel-Gear Differential to the Floating Rear Axle

FOR 1912 the Stevens-Duryea motor cars will appear as three chassis models, AA, X and Y. The first is a continuation of this year's model AA with no radical changes, the departures from this year's practice being more in the nature of refinements than new designs. While the other two models in the Stevens-Duryea line this year, the six-cylinder model Y and the four-cylinder model X, probably will be continued in 1912 without change, no announcement as yet has been

made. The present discussion is based on the AA chassis.

The more important changes in the chassis of the model AA for next year are in the substitution of the Bosch two-independent ignition system for the double system in use this year, the addition of a four-cylinder gear-driven air pump for tire inflation, the installation of a gasoline gauge and the addition of top, speedometer and windshield to the standard equipment.

The unit power plant supported on three points, a feature originated in Stevens-Duryea construction, is retained in the new model AA. In this form of construction the six-cylinder motor, clutch and gearset are incased in a single rigid member supported on opposite points of the frame in front and at the center of a dropped cross member at the rear. The method of support of the power plant is illustrated in Figs. 1 and 9, the points of support being indicated by the figures 1, 2 and 3.

The motor itself has six cylinders, $4\frac{1}{4}$ inches bore and $4\frac{1}{4}$ inches stroke, cast in pairs. It is of the L type, with the valves all on one side.

The crankshaft has four main bearings and is machined and ground to close limits from a forging of special steel. Two bolts are used to secure the caps of the big-end connecting rod bearings, and solid brass shims are introduced. White metal of special analysis is used in connecting-rod and main bearings. The connecting rods are carbon steel forgings with non-grain bushings pressed into the small end of the rod for wrist pins. Twenty-four bolts secure the cylinders to the aluminum crankcase and are carried through it, per-

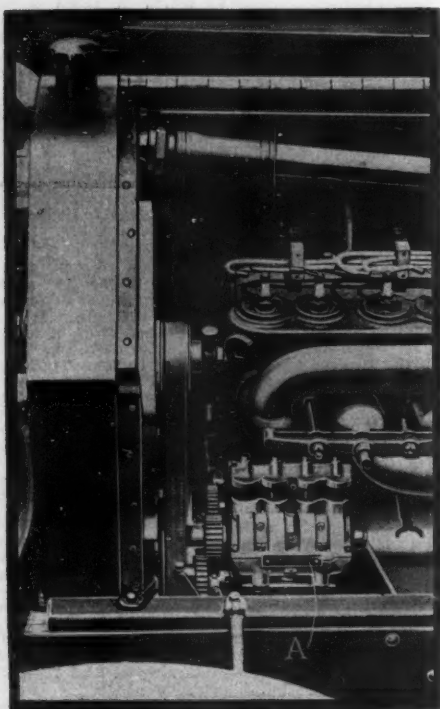


Fig. 2—The Four-Cylinder Power Air Pump A, Mounted on an Aluminum Bracket and Gear Driven From the Camshaft.

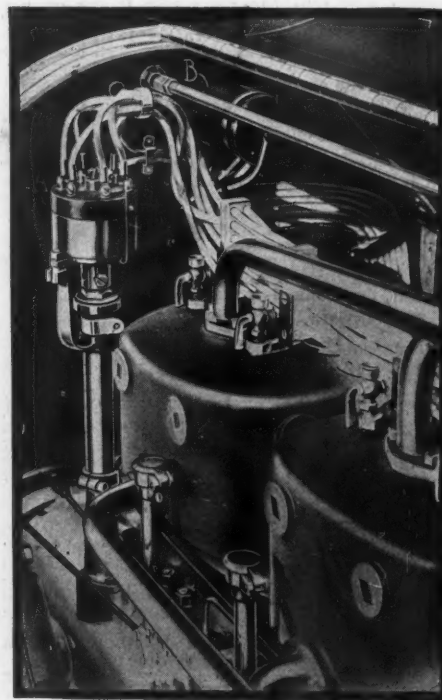


Fig. 3—View Under Hood Showing Location of Bosch Timer-Distributor A and Horizontal Dash Coil B.

mitting placing lock nuts on the inside ends.

On the left side of the motor is the camshaft, whose twelve cams operate the inlet and exhaust valves. The camshaft is driven from the crankshaft by the gears B and D, Fig. 6, which are enclosed and operate in oil. The valve tappets embody a departure from previous practice, as they are made of bronze instead of steel as formerly. They are of the plunger and roller type and the design includes a rather unusual arrangement, that of an oil trap

for each tappet guide, which catches the surplus oil and returns it to the crankcase.

The exhaust and intake manifolds are attached to the cylinders by a strap for each pair of cylinders, and the faces of the manifolds and ports are surface ground. An intake pipe of the ordinary Y type with a central branch for the middle pair of cylinders is used, with a union nut at the base for the attachment of the carbureter.

The carbureter is of special Stevens-

Duryea design, with gasoline supply by gravity. The jet supply of air is taken in at the bottom through a small pipe which connects with the exhaust pipe; this air is heated while the additional air supplied by the automatic air valve is taken direct from under the hood. The vertical tube above the throttle is water-jacketed.

The three-point suspension idea is applied to the fuel tank as well as to the motor. As indicated in Fig. 10, the tank is located under the front seat and is supported by three blocks riveted to the main frame. Two of these blocks hold the right-hand corners of the tank while the third is on the left frame member at the middle of that side. The tank is divided to give an emergency supply of 3 gallons and two valves for cutting off the main and auxiliary supply are fitted below the tank and operated from outside the chassis frame by hand levers. The gasoline gauge, the dial of which is directly beneath the driver's seat, is an integral part of the tank.

The cooling system embraces a cellular radiator and centrifugal pump which is driven from the layshaft on the right of the motor. An aluminum fan is driven by means of a flat belt from a pulley keyed on the forward end of the crankshaft. The supporting bracket for the fan is attached to the base of the motor, while the complimentary bracket is made self-adjusting by means of coil springs.

The lubrication to the main bearings is obtained by means of a mechanical oiler gear driven from the layshaft. All the other parts of the motor get oil by splash from the crankcase. The oil to the main bearings is led through sight feeds. The six-throw crankshaft is mounted on four bearings with two cranks be-

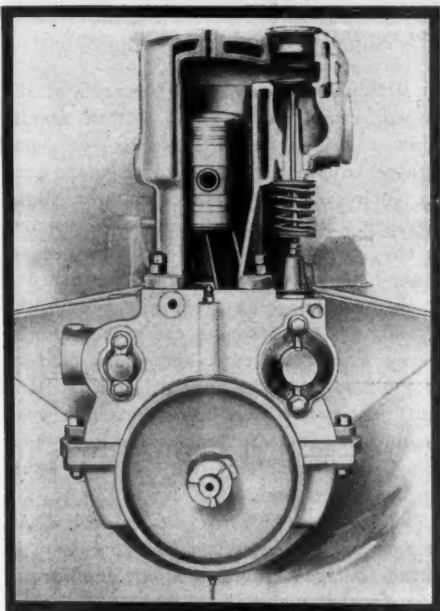


Fig. 4—Sectional View of Front of Motor Showing Piston, Valve, Water Jacket and Combustion Chamber. The Arms at the Extreme Right and Left are the Two Supporting Members at Forward End of Power Plant. The Third Point of Support Is Central to the Forward Arms and at the Extreme Rear of Unit Power Plant

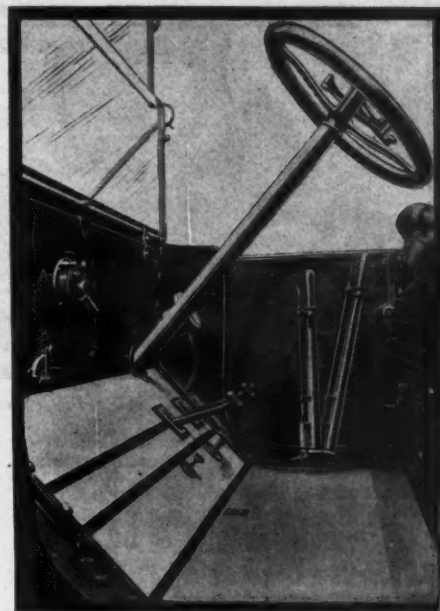


Fig. 5—View of Dash of AA Touring Car, Showing Inside Control Levers, Dash Kick Switch A and the Auxiliary Air Control B

tween each pair of bearings. The boxes at these points are connected with the lubricator, the lower half of the crankcase forming the reservoir for the oil escaping from the main bearings. The connecting rod splashes into this and supplies pistons and connecting rods.

The ignition system in the 1912 model AA is the Bosch two-independent system. This includes a Bosch high-tension magneto and a storage battery. The current for one set of plugs is generated by the magneto connected with the camshaft by spur gears, A, B and D, Fig. 6, and the other by battery and a single induction synchronous coil on the dash, combined with a kick switch. Only the switch ap-

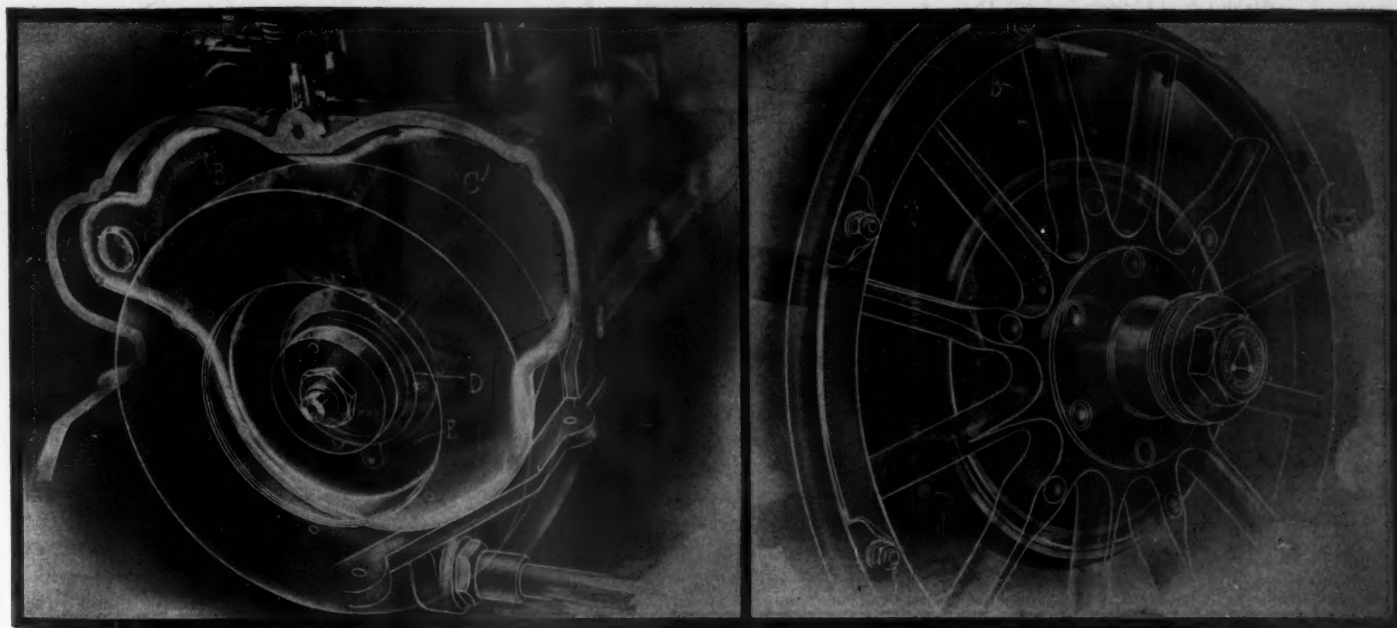


Fig. 6—Phantom View on Left of Timing Gears. The Small Gear A at the Extreme Left Operates the Magneto, B Operates the Camshaft, C Operates the Layshaft, the Intermediate Gear D Drives Both Cam, Lay and Magneto Shaft Gears, as well as the Oil Distributing Gear E. The White Outlines are to Illustrate the Periphery of the Flywheel. On the Right Is a Phantom View of the Rear Wheel, Showing the Brake Construction and the Adjusting Thumb Nuts A and B and the Cross Rocker Shaft for the Service Brake

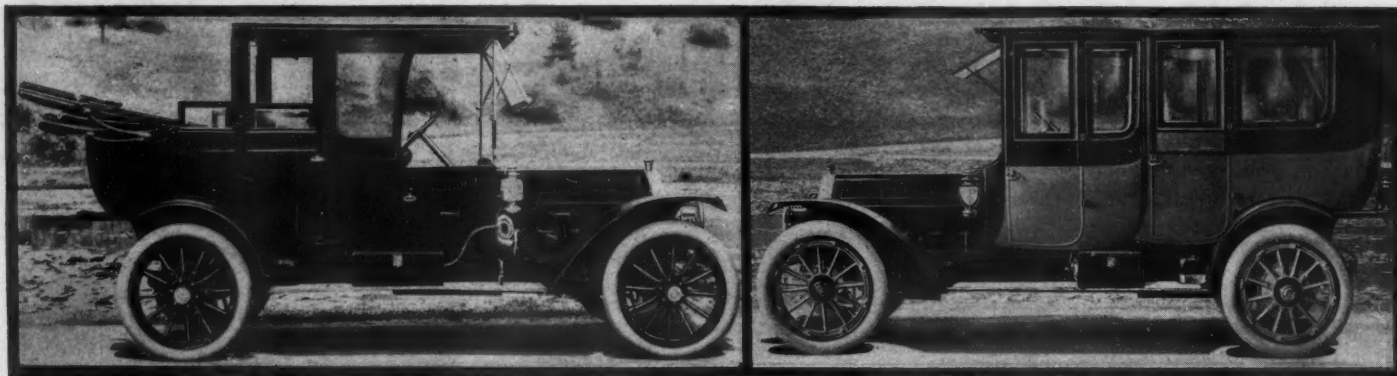


Fig. 8—Stevens-Duryea 7-Passenger Landaulet on Left and Berline on Right as Fitted to the 1912 Model AA Chassis

pears on the dash, as the coil extends under the hood as indicated at B, Fig. 3. The ball-bearing timer-distributor, A, Fig. 3, for the battery system is driven from the layshaft. The magneto driving shaft runs on annular ball bearings, while interposed between the magneto and the end of the shaft is a universal coupling. A push button on the switch A, Fig. 5, throws in the vibrator for starting on the spark with the battery. Either system or both at once can be used as desired.

On the left side of the motor base is bolted an aluminum bracket which holds the four-cylinder air pump A, Fig. 2, for inflating the tires. This is driven from the camshaft.

The clutch is the Stevens-Duryea standard type of dry plate multiple disk. This has been used in all products of this factory since 1904. The clutch has nine steel disks contacting with eight plates double-faced with woven wire and asbestos. The driving member of the clutch is fitted to the crankshaft on a taper square making an unshakable fit, while the gearbox end of clutch is connected by square clamps. A ball-bearing ring releases the clutch by means of a forked lever operated by the clutch pedal. It is interesting to note that dispensing with clutch brake has been found possible, owing to the instant release of the contacting surfaces of the dry plates.

The gearset housing forms the rear of the unit power plant casing and has on its under side two lugs cast integral with the aluminum case, through which the king bolt of the third point of support passes. The case proper is cast without the usual central horizontal division, which insures an oil-tight compartment. There are three speeds with ratios of 11.9 to 1 for low, 6.91 to 1 for intermediate, $3\frac{1}{2}$ to 1 for direct, of the straight through type, and the recessed dog design direct drive on third speed, the secondary shaft always remaining in mesh.

A squared shaft is used for the sliding gears, while the rear end of this shaft and both ends of the countershaft rotate on annular ball bearings. Ample provision is made for lubricating the telescope end of main shaft, both inner and outer bearings having large oil ways returning to gearset case. The escape of oil from

bearing caps is prevented by making the thread perfectly oil tight and a series of return oil grooves where the shaft extends through.

Turning now to the gear operating lever, this has the feature of being self-finding without the usual lateral movement, a series of ledges in the quadrant forming the stops for the respective gears. Neutral is between low and intermediate, the raising of the latch and forward movement of lever registering the gears in intermediate or second gear; continuing forward without touching the latch, engages the high or direct drive. The lower speeds are engaged in the same manner, only the lever is moved toward the rear of the car

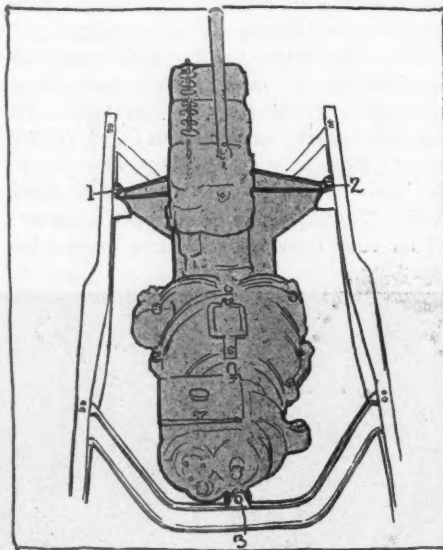


Fig. 9—The Three-Point Suspension of the Unit Power Plant of the Model AA Chassis

—the reverse engagement being at the extreme rear of quadrant.

As the driveshaft is open, the universal joints are necessarily of the self-contained type and of most interesting design. The cross contains a central lubricating compartment supplying the four accurately ground arms through a hole drilled central to their circumference, while their surfaces are greased by parallel ways of the non-returnable type.

Internally ground and integrally headed cup-shaped arms are pinned and held by nuts to cross arms on the driveshaft of the gearset, propeller and pinion shafts.

By fitting these cups over the arms of the central cross, a universal motion results while the centrifugal force as the joint rotates, caused the grease to circulate over the entire bearing surface, under a slight pressure. No lubricant can be forced out as the inner lip of the four cups presses against the outer shoulder of main cross. To insure the joint from any possibility of leakage, felt washers are placed in the recess where the cups and cross contact on their edges. The forward end of drive shaft is square and telescopes the rear member of forward universal, a greaser being supplied at this point as well as at the central crosses.

The torque tube is of simple design. At its forward end an offset ball extension is bolted to cross frame member, the torque tube proper, which is bolted to the rear axle by three large bolts, has a hardened steel ball at its forward end supported by cups and springs concentric with a short tube supported on the lower ball stud.

The rear axle is of the floating type; this design allowing the removal of driving shaft from the axle through the hubs. A spur differential gear of unusual design is used. The covers of the differential case are accurately dovetailed in the case supporting the driven gear, and simply held in position by three bolts and nuts passing from one cover to the other, but in no way subjected to strain. This also applies to the spur pinion studs; these are machined with a shoulder pressing on the inner surfaces of the covers. The holes in which these studs fit cannot change from their original alignment, as the dovetailed covers remain in the same position irrespective of the pressure applied.

The removal of the aluminum cover over the differential allows it to be withdrawn complete, while the pinion shaft and gear, which are forged integral, may be removed from the large end of short casing projecting forward towards the gearset. This integrally forged pinion shaft and gear rotates on annular ball bearings of extreme size, as do the rear wheels—which have their bearings at the extreme inner and outer ends of the hubs.

Both hand and foot brakes are operative on accurately ground 14-inch brake drums. The hand or emergency bronze brake shoes expand internally, the foot or service

brake shoes—lined with raybestos—contract on the outer faces of the drum. An accessible thumb nut, Fig. 6, allows a ready adjustment, while an effective ball and socket equalizing device, interposed in the cross rocker shaft on the chassis frame, allows the service brake to be kept in working condition without jacking up the car.

The wheelbase is 128 inches and 36 by 4½-inch tires are used front and rear, except on the seven-passenger touring cars, where tires 5 inches in diameter are employed. The front axle is a pressed steel I beam.

The front wheels rotate on taper roller bearings while the load on the upper end of the steering knuckle is carried by ball thrust bearings. The pins forming the joints between the knuckles and the forks have their axes arranged vertically, but the stub axles slope slightly downward from the horizontal, so that the wheels are splayed sufficiently to bring the tires at their point of contact with the road immediately beneath the axes of the pivots. This gives what is known as the center point steering, which by abolishing the leverage between the lowest point of the tire and the steering pivot is believed to reduce the resistance in moving the wheels when steering, and also the degree to which road shocks react on the steering mechanism.

The steering gear itself is of the worm and sector type, the worm being an integral part of the steering column while the sector in the steering case is attached to the drag rod on a taper square.

The drag rod on the outer end of the sector axle is carried down inside the frame to the steering connecting rod which is coupled up to the right-hand steering arm. The connecting rod is tubular and fitted with the spring ball-and-socket attachments to allow of a slightly resilient connection between the members.

The frame is unswept at the forward and offset over the rear axle and of pressed chrome nickel steel, as are the four cross members riveted to side frames under pressure. Semi-elliptic springs 48 inches long are used at the front, while the rear suspension has three-quarter

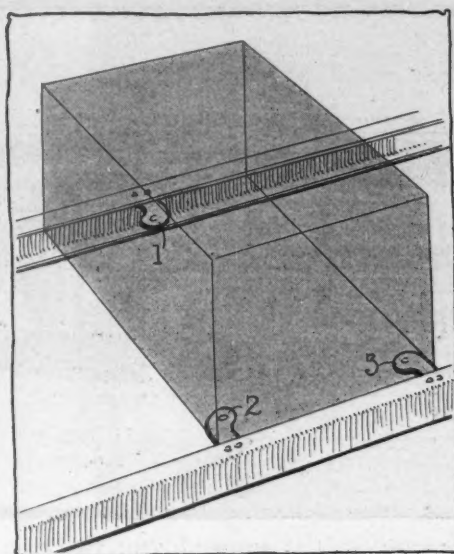


Fig. 10—Three-Point Suspension Idea Used in the Support of the Fuel Tank

elliptic springs. In connection with the springing there is a demonstration of careful design, for the springs are held in special clips with an integral plate at the top, thus the springs are not drilled, so avoiding a frequent source of trouble. The bed plate for the rear springs swings on the axle sleeves to relieve the torque from the springs themselves.

Five open touring bodies, ranging in passenger capacity from four to seven, and three types of seven-passenger enclosed bodies, are fitted to the standard model AA chassis. The doors, panels and underbody are of steel aluminum, each being formed to shape by the hand-hammering process. The sills and framework are of ash and have forged reinforcements that receive the top irons at their upper ends, the lower ends extending to the seat frame. Top, speedometer and windshield have been added to the standard equipment of the car as sold.

Features of New Republic

FOR 1912 the Republic car will be manufactured in one chassis which will take different bodies, including a five-passenger touring car with fore-doors and a torpedo roadster with side doors. The Republic, the product of the Republic Motor Car Co., is a two-unit chassis, the four-cylinder four-cycle motor constituting one unit and the entire transmission system made up of the combined rear axle and gearset together with a torsion tube which encloses the propeller shaft comprising the other. As in the majority of two-unit chassis in which the gearset and rear axle are combined there is but one universal joint located at the forward end of the torsion tube so that its axis coincides with the trunion support of the torque tube.

The motor employed is a T-head design with cylinders cast in pairs having the intake valves placed in the right and the exhausts on the left. The cylinder sizes 4¼-inch bore and 5-inch stroke give an S. A. E. rating of 28.9 horsepower. A higher rating, however, is given by the

company which is based on the large-diameter valves employed, namely, 2¼ inches, and also on the fact that the cylinders are offset ¼ inch from the center plane of the crankshaft, which according to laboratory tests increases the motor efficiency.

The general motor equipment is conventional and is made up as follows: A Stromberg carburetor is used, it having a special hot air attachment for the main air intake. In order to prevent condensation of the mixture between the carburetor and the cylinders of the lower portion of the intake manifold it has been water jacketed. The gasoline supply is carried in an 18-gallon tank located under the seat in the touring car and back of the seat in the roadster. Feed is by gravity. A reserve supply of 3 gallons is arranged for in the tank.

Two independent sets of ignition are used. One set is a Bosch magneto system and the other is a Delco outfit which takes its current from a set of six dry cells and delivers it to the plugs through a high-

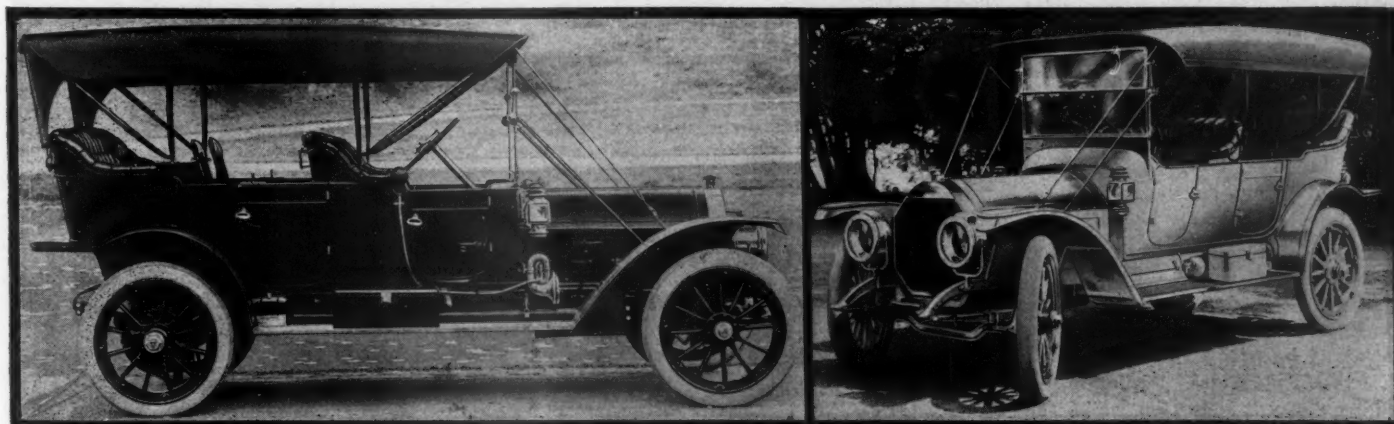


Fig. 11—On the Left, Stevens-Duryea Five-Passenger Standard Touring Car. On the Right, Touring-Car Body With Hooded Dash

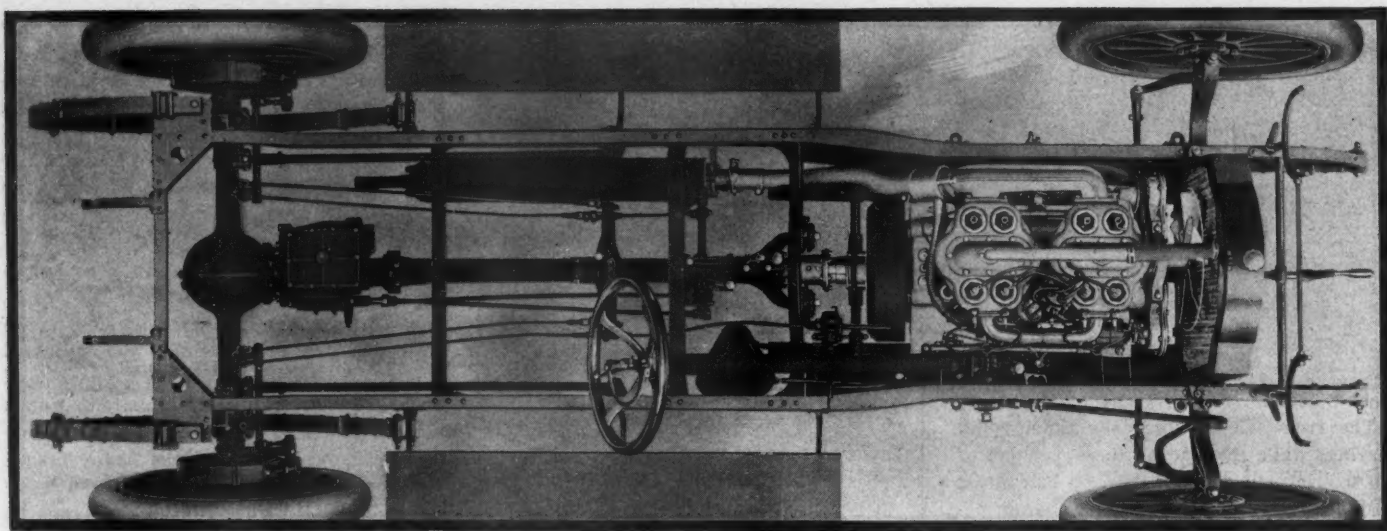


FIG. 1—PLAN OF REPUBLIC CHASSIS SHOWING THE TWO-UNIT POWER PLANT

tension distributor. With this system a guarantee of 2,000 miles on a set of six cells is given.

Cooling of the cylinders is by forced water circulation, a centrifugal pump drawing its supply from a cellular type radiator. A fan driven by belt from the crankshaft assists in keeping the temperature of the water low.

A circulating lubricating system is used. This is made up of the usual pump which draws its oil from the crankcase reservoir or sump and delivers it to the three crankshaft bearings. The crankshaft is drilled and the oil from the three main bearings goes through the drilled shaft to the lower connecting rod bearings. A splash system is used in addition to this, which lubricates the cylinder walls, wristpins, piston rings and camshaft bearings. A float with gauge shows the level of oil in the crankcase reservoir.

In practically all structural lines the motor is a conventional one. The crankcase is a two-part aluminum casting, the upper portion carrying three crankshaft bearings, the lower portion constituting the oil reservoir. Timing gears at the forward end are entirely enclosed. The four-point suspension is made use of in supporting the motor of this chassis.

The clutch is a cone type faced with leather and fitted with cork inserts. The gearset, a three speed selective design, has both shafts carried on Hess-Bright bearings. The gears are chrome Vanadium steel. The gearbox is not formed as a unit casting with the differential, but has a circular flange on its rear face which bolts to a corresponding flange on the differential. The rear axle housing is made up of two bell-shaped pressed steel housings bolted together. The vanadium steel drive shaft to the axle is carried on Hess-Bright bearings and as is any floating axle construction may be withdrawn. The torsion tube is a heavy structure carrying a cross-piece midway of its length on which the brake operating mechanism is attached, this being done in order to keep constant the dis-

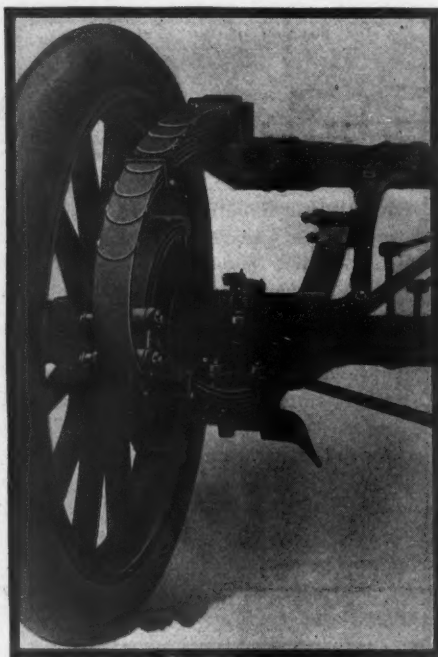


FIG. 2—SPRING SUSPENSION OF REPUBLICS

tance between these points and the rear axle. Brakes are internal and external ones operating on a common drum on the rear wheels.

The Republic running gear is built around a pressed steel framework which is formed in bottle neck shape at the dash

and raised at the rear where it carries large gusset plates which serve to carry the upper leaves of the three-quarter springs. In order to lower the frame support at the rear as much as possible the lower portion of the spring is carried under the axle, a practice followed by one or two foreign builders this season. The lower support of the body is further obtained by clamping the upper portion of the spring above the gusset plate instead of beneath it. The front axle is an I-beam forging with jaw ends to take the steering pivots. Ball bearings are in the front wheels; the cross rod or tie-rod is back of the axle; and the drag link connecting the steering mechanism to the steering gear is located above the axle. The steering gear is a worm-and-sector type with thrust bearings above and below the worm. The steering column is raked 42 per cent on touring cars and 40 per cent on the roadster. An 18-inch steering wheel is used. Semi-elliptic front springs are 40 inches long with leaves 2 inches wide; the rear springs are 45 by 2 inches. The chassis wheelbase measures 120 inches, 36 by 4-inch, tires are fitted all around, and quick detachable rims are used on the wheels.

The cars as sold are equipped with the usual top, lamps, windshield, tire irons, roberail, speedometer, and other accessories most used by motorists.

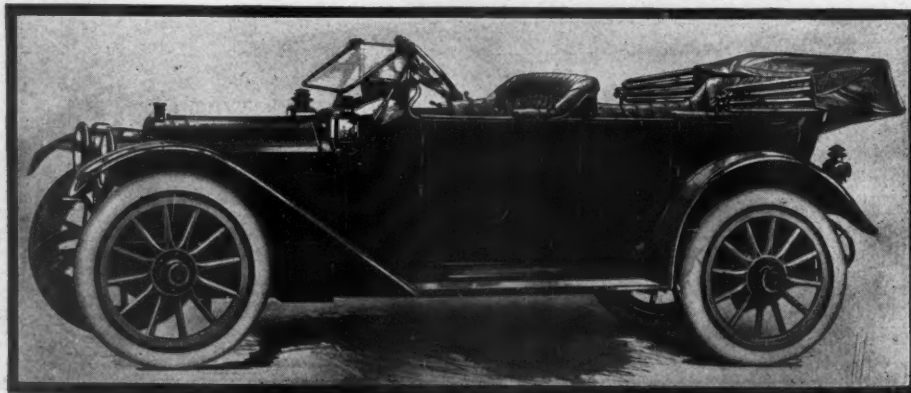


FIG. 3—REPUBLIC FIVE-PASSENGER FORE-DOOR TOURING CAR

Three Knox Chassis Models

FOLLOWING a year-old policy of the Knox factory of paying little attention to annual models and of incorporating new features or refinements as soon as approved by the testing department, there are no startling changes announced for the 1912 Knox line. The model R, 4-cylinder, 40-horsepower chassis, with

1912 Line Includes a New Four-Cylinder Motor with a Long Stroke—Center Gearshift and Emergency Brake Levers

three different lengths of wheelbase and ten different body designs, and the model S, 6-cylinder, 60-horsepower chassis, with two lengths of wheelbase and six body designs are continued as before with but few minor changes, which merely follow the tendency to cleaner body lines and greater convenience.

The one addition to the Knox line is a chassis with a 4-cylinder motor of greater stroke than the model R. This is called the model R-45 and has four individual cylinders with a bore of 5 inches and a 5½-inch stroke. The chassis is specially designed for closed-car service where a slow-speed motor is more in demand. Center gearshift and brake control and either right-hand or left-hand steering is provided. With the exception of the stroke and the wheelbase, 126 inches, the model R-45 is identical with the older model R.

The principal changes in the models R and S for the next year are the change in location of the gearshift and emergency brake levers from the right side of the frame to the center, giving left-hand control for these levers. An option of left-hand steer is also offered on the model S. The equipment has been enlarged by the addition of a sheet-metal tire carrier trunk slung under the trunk rack at the rear of the car. It takes a mounted tire and rim and does away with tires on the

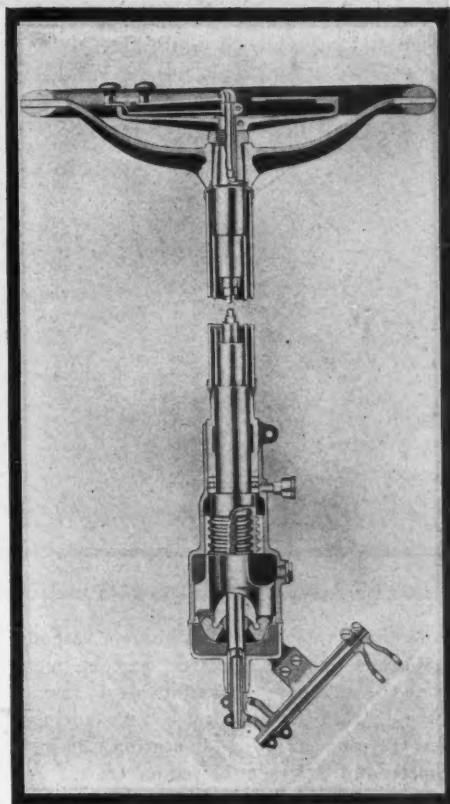


FIG. 3—KNOX STEERING GEAR

running board, leaving entrance to the driver's seat clear, which is in line with the change of the position of the levers. Another addition to the equipment is a motor-driven tire pump and a gauge for the gasoline tank.

All the Knox cars for 1912 will show the same features of construction that have been their characteristics for the last five years. These comprise the unit power plant suspended at three points, valve-in-the-head motor with the heads of the cylinders detachable, three-plate disk

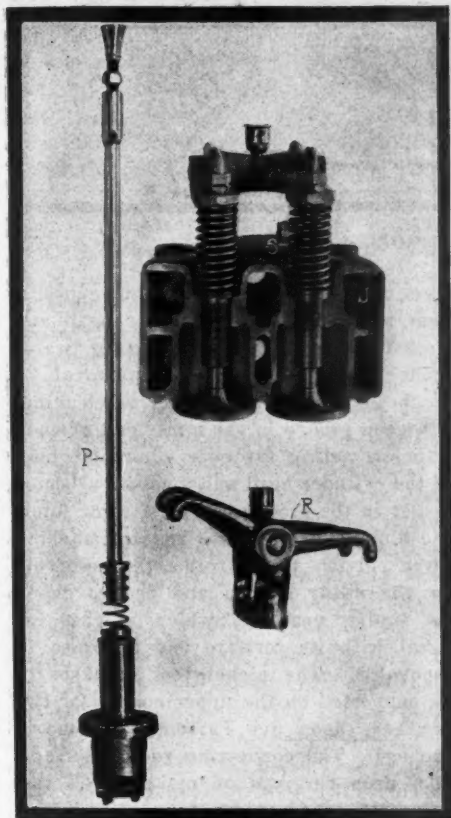


FIG. 1—THE KNOX OVERHEAD VALVE MECHANISM

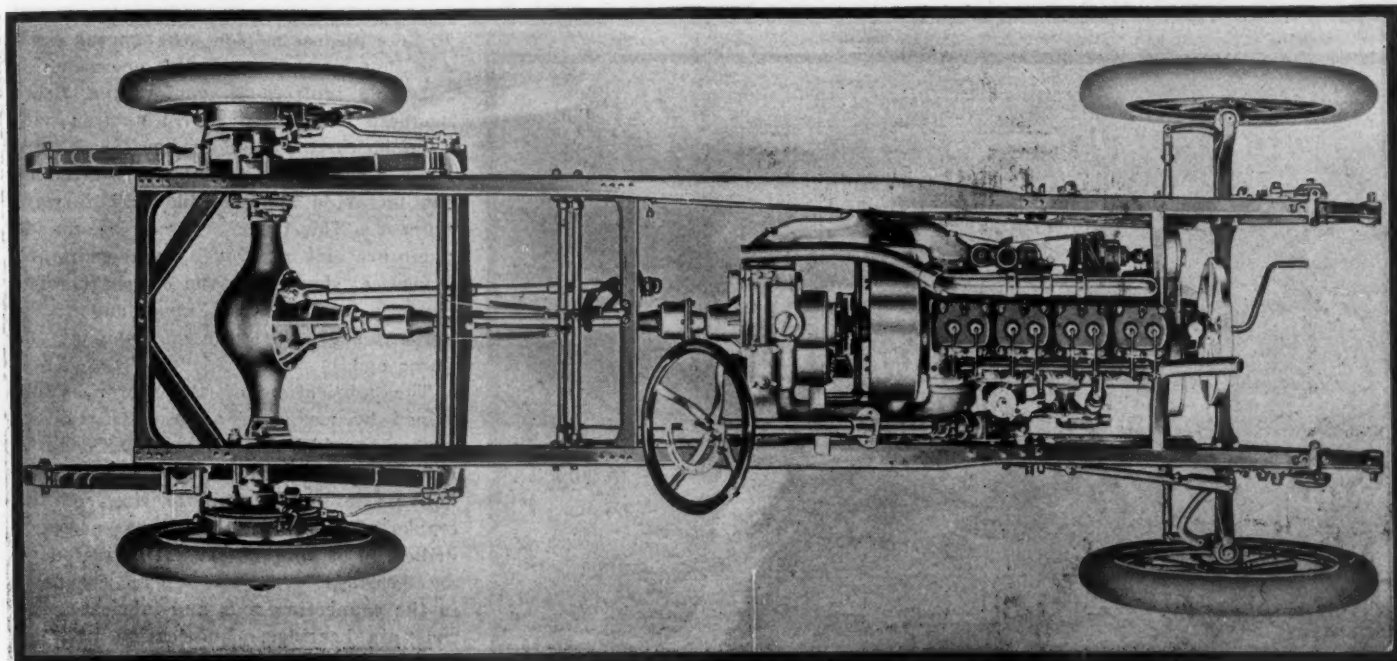


FIG. 2—CHASSIS OF KNOX 1912 MODELS R AND R-45 SHOWING UNIT POWER PLANT AND THREE-POINT SUSPENSION

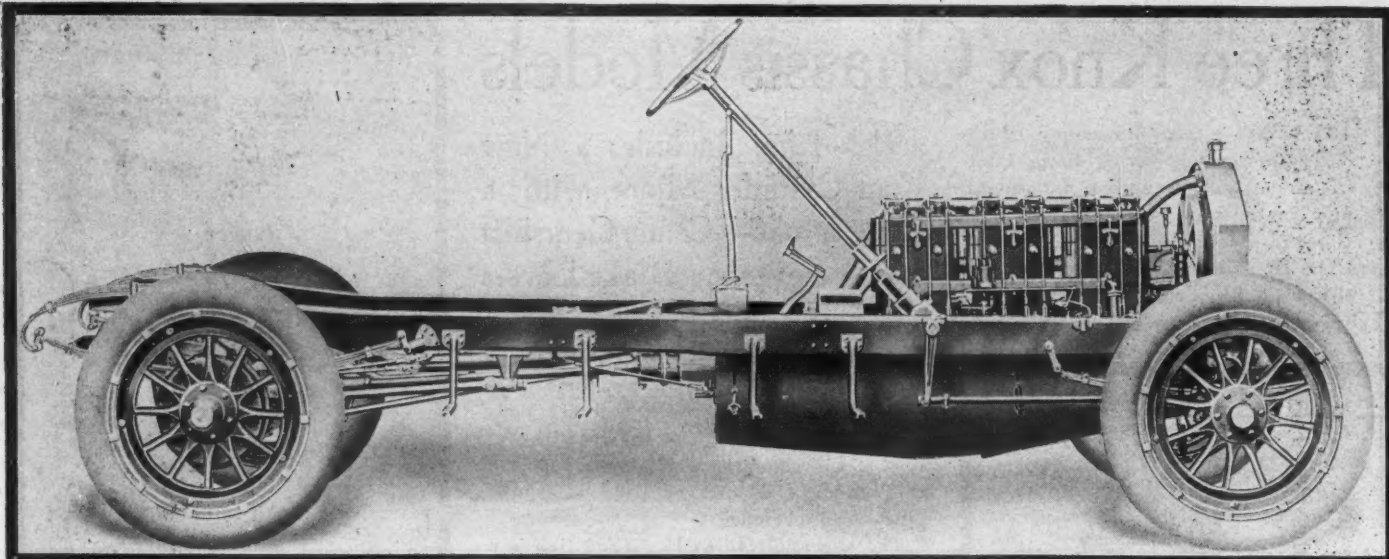


FIG. 4—SIDE VIEW OF CHASSIS OF KNOX SIX-CYLINDER MODEL S

clutch and floating rear axle. Among the other general features may be mentioned the heavy channel steel frame, three-quarter scroll elliptic rear springs, heavy front axle of I section, 38-inch wheels and 5½-inch bolted-on tires.

The unit power plant of the Knox car, forward of the gearset, is illustrated in Fig. 1. It consists of the base of the engine, forming the upper part of the crankcase, two heavy side arms bolted to the rear end of the crankcase and the gearset housing, to which the rear ends of the flywheel, which is within the arms and the mechanism by which it is operated are located within and to the rear of the flywheel, which is within the arms and between the crankcase and the gearset housing. An arched bronze cross member of the frame supports this foundation for the power plant through a flexible trunnion at the front; and midway between the two side arms at the rear, connection is made to the two side

members of the frame. The removal of four bolts and disconnection of the front universal joint allows the power plant to be removed from the chassis, while either motor, clutch or gearset may be removed without disturbing the other parts.

The motor of the model R is illustrated in Fig. 5, in which it will be noted that the cylinders are cast separately. The cylinder head, showing the arrangement of the overhead valves, is illustrated in section in Fig. 1, which also shows the parts of the valve-operating mechanism. In this illustration the valves are operated through long pushrods P and rocker arms R from a single camshaft within the crankcase.

The heads of the cylinders are detachable, which permits of grinding and machining the cylinder walls accurately. This also permits of machining the combustion chamber so that the compression space is the same in all cylinders and the smooth surface prevents to a great de-

gree the formation of carbon deposits. Four studs hold each cylinder head and loosening them and the cooling water connections permits of the removal of the head for valve grinding or cleaning.

A deep groove in the upper end of each cylinder casting fits over a circular boss on the cylinder head and a copper-asbestos gasket in the groove assures a tight joint. The aluminum crankcase has a removable lower portion which forms the reservoir for the oiling system and the cover of the timing gearcase, which is cast integral with its forward end and also is removable. The nickel-steel crankshafts are supported on the upper portion of the crankcase upon five Parsons white-metal bearings. The connecting rods are made from drop forgings of nickel steel, the caps held in place by four bolts. The camshaft gear and idler gear are of cast iron while the crankshaft gear and the magneto gear are steel. The idler gear is supported upon an adjustable bracket to take up lost motion between the gears and thus make for noiseless operation.

Double ignition is employed, a Bosch magneto being used in conjunction with a Connecticut coil and timer for the dry battery side. The magneto is located on the left side opposite the first forward cylinder. The timer as well as the oil pump are driven through bevel gears and a vertical shaft from the camshaft. The timer is located at the upper end of the vertical shaft with the oil pump at the lower end.

The lubrication of the motor is obtained by means of a circulating oiling system in which the oil pump referred to above draws oil from the reservoir and delivers it to the main bearings of the crankshaft. The crankshaft has passages drilled in it so that the oil delivered to the bearings runs up through channels in the connecting rods and lubricates the wrist-pin bearings. Lubrication between the pistons and cylinder walls is obtained by the oil thrown off the bearings.

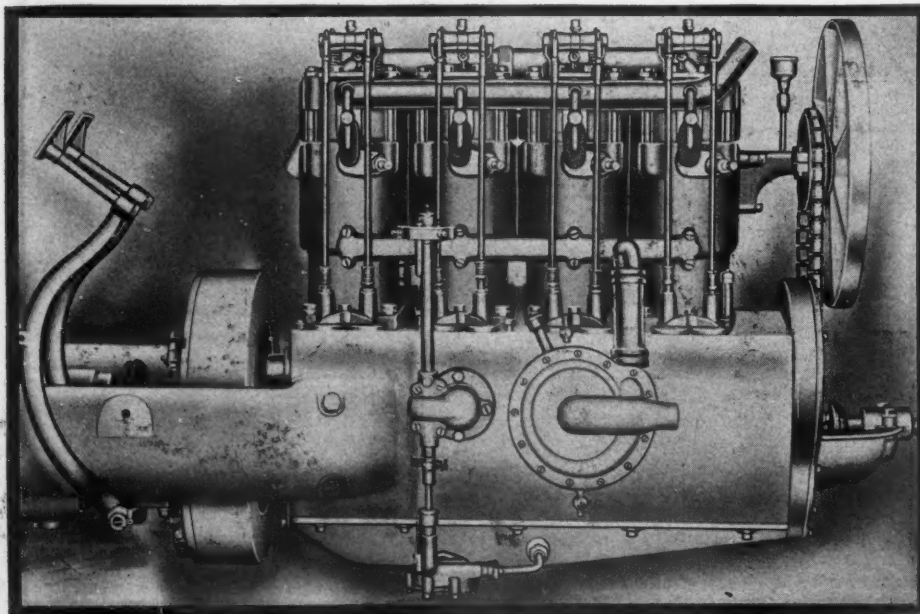


FIG. 5—SIDE VIEW OF MOTOR AND CLUTCH OF THE FOUR-CYLINDER KNOX

The motor is cooled by means of a large centrifugal pump on the right side of the crank case and driven off the camshaft. This draws the water from the exceptionally wide flat-tube radiator and forces it up through aluminum connections to the lower part of the cylinder jackets, through them to the upper part of the jackets from which it is returned to the radiator. A fan driven by silent chain from the crankcase assists in radiation.

From the motor power is transmitted through a three-plate clutch immediately at the rear of the flywheel. The center plate of the clutch is provided with cork inserts to insure smooth engagement. The Knox gearset, which gives three forward speeds, is unusually compact in design with the shafts very short between bearings. The arrangement of the power plant forward of the gearset is shown in Fig. 5 and the plan view illustrating its relation to the rest of the chassis is illustrated in Fig. 3. The gearshift and emergency brake levers, not shown, are located in the center instead of on the right side as formerly.

The drive to the rear axle from the gearset is by means of a propeller shaft with two universal joints. The torsion rod on the left-hand side of the shaft is attached at its forward end to the cross member of the frame and is illustrated in Fig. 3. The construction of the rear axle is shown in Fig. 7, in which the housing is cut away to illustrate the internal arrangement. The rear axle is of the floating type in which the weight of the car is supported upon the outer ends of the rear axle housing. The differential is of the bevel gear type, power from the shaft S being transmitted through the beveled driving pinion P to the large bevel gear G and then through the differential D to each half of the axle. It will be noted that annular

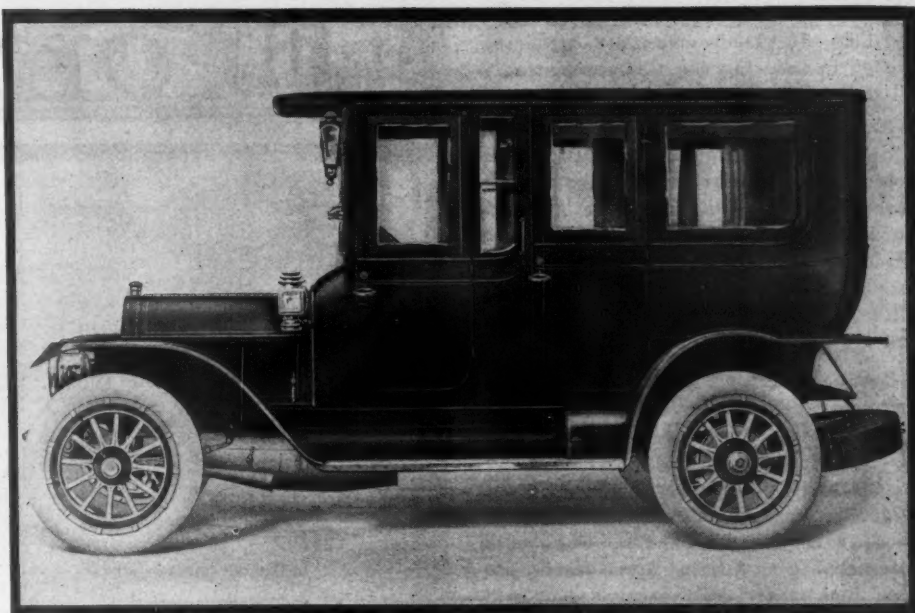


FIG. 6—KNOX BERLINE BODY ON R-45 CHASSIS SHOWING POSITION OF TIRE TRUNK

ball bearings are used throughout the rear axle. The service brakes are of the contracting band type and operate on the drums B while the expanding emergency brakes work through the arms A upon an inner drum.

The front axle is of the familiar I-beam section but is particularly heavy. The front wheels are supported on Timkin roller bearings which are also used at the upper end of the steering knuckles. The latter feature renders the steering knuckles adjustable for wear and insures easy steering. The steering gear is a worm and nut construction and is illustrated in Fig. 7. It is nonreversible and the worm has a double thread.

The frame of the Knox car is made from cold pressed steel, the top flanges being exceptionally wide at the middle for the rear points of support of the

power plant, and tapering gradually toward the rear. The springs used are $\frac{3}{4}$ scroll elliptic in the rear and semi-elliptic in front. The wheelbase of the model R is 104 and 117 inches on the raceabouts and 122 inches on chassis for the other bodies.

The model S chassis has just the same general features as the model R, the main difference being in the number of cylinders of the motor. The cylinders themselves are just the same size as those of the model R, but six of them cast in pairs go to make up the engine. The battery side of the double ignition system is of Atwater Kent design. There are two different lengths of wheelbase on the model S, 106 inches on the raceabout and 134 inches when other bodies are fitted. The longer stroke of motor employed in the model R-45 is also offered in six-cylinder form for the model S chassis.

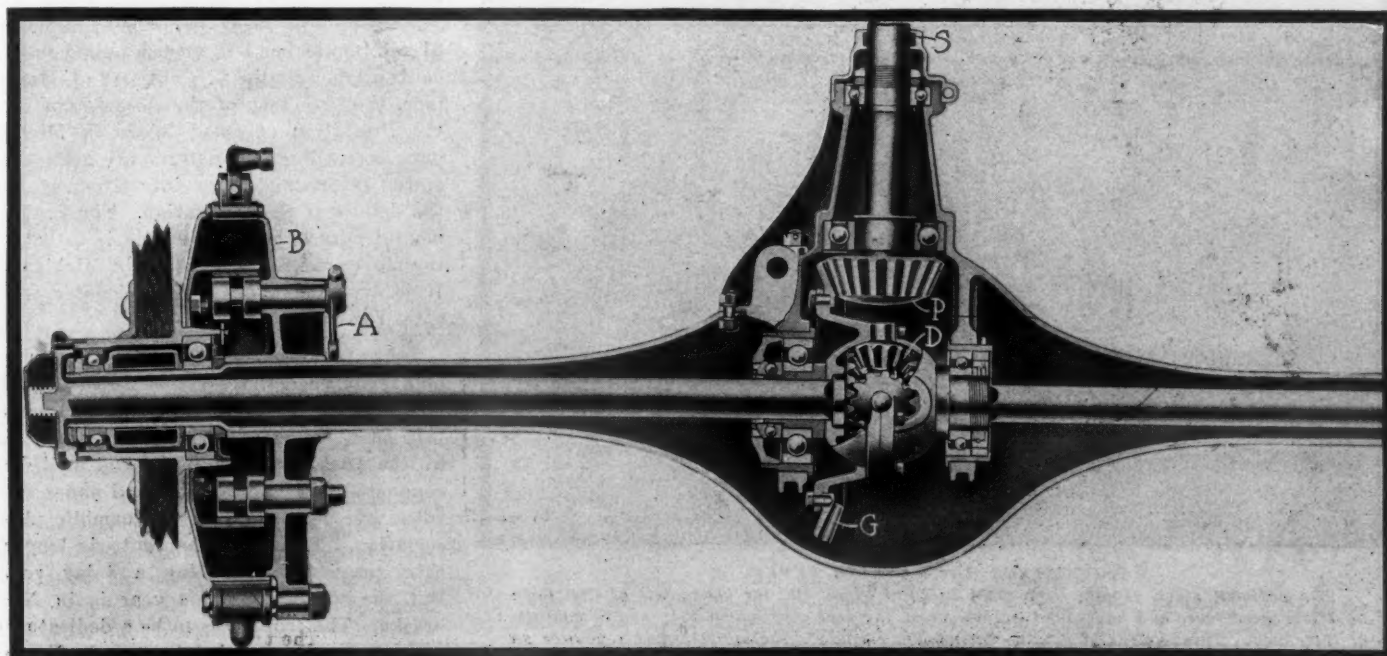


FIG. 7—SECTIONAL VIEW OF KNOX REAR AXLE SHOWING CONSTRUCTION OF DIFFERENTIAL

OILING St. Louis' Unpaved Streets.—

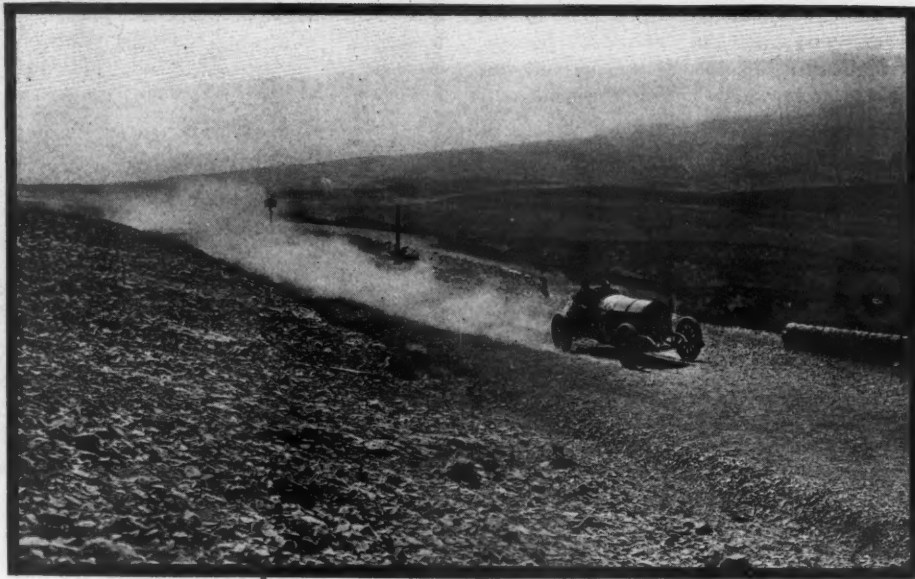
East St. Louis motorists have succeeded in inducing the city authorities to oil the unpaved streets.

Another Active Club—The Ashland Automobile Club, of Ashland, Wis., has voted an appropriation to cover the expense of signboarding all of the highways in Ashland county. The club also has purchased a King split-log drag and will keep the main traveled highways in condition. Members have offered their cars and horses to pull the drag.

Posting Warning Signs—The country surrounding Toledo will soon be dotted with warning signs telling motorists of the speed laws of Ohio, and drivers violating the 15-mile an hour limit will be prosecuted, according to present plans of the Lucas county commissioners. Signs will be erected 1 or 2 miles apart on all the main highways. On the same signs will appear the request, "Do not drive in track to avoid making ruts." The purpose is said to be the preservation of macadam and other improved roads.

Oiled Roads in Milwaukee—Sixty-eight miles of streets in Milwaukee, Wis., have already been given a coat of asphaltum oil this summer and before the department of public works ceases its labors for the season it is expected that the total will be raised to 120 miles. Only the macadamised streets are being oiled and the first lot of 300,000 gallons of oil has been exhausted and 200,000 additional gallons are now being applied. The cost to the property owner is about 4 cents per running foot, while ordinary sprinkling costs 2½ cents per running foot per year. One application of oil lasts about 2 years, so there is an advantage to the property owner. Motorists as a rule are

From the



WINNER OF THE MONT VENTOUX CLIMB

A Cottin-Desgouttes six-cylinder car was the winner of the recent Mont Ventoux hill-climb in France, the greatest event of its kind in Europe, the mountain road being 13½ miles in length and of considerable grade

satisfied with the use of oil, although there are complaints that the preparation has been applied too heavily and is damaging cars and tires.

Protecting Theater-Goers—Chief of Police Sebastian, of Los Angeles, has issued a notice to the effect that at the six big theaters in Los Angeles, policemen will be stationed outside during the performance to guard motor cars. This was brought about through the efforts of Miss S. C. Geary, secretary of the Automobile

Club of Southern California. Hereafter motorists can go to the theater and rest assured that their cars will not be molested or stolen.

St. Louis Wants Racing—Negotiations are under way with the American Automobile Association to arrange for races in St. Louis the first week in October. The mile track at Maxwelton, just west of St. Louis, will be finished by that time. The track is 60 feet wide and is banked 8 feet.

Michigan Calls Road Congress—Enthusiastic good roads men from Grand Rapids as well as many other large cities of Michigan, will meet in Lansing August 31 and September 1 to attend a good roads convention. Philip T. Colgrove, of Hastings, the president of the Association for the Promotion of Good Roads in Michigan, is sending out letters all over the state, informing those interested as to the details of the convention. The fundamental purpose of the meeting is to boost the movement for good roads in Michigan. It is expected about 1,000 delegates will attend the meeting.

Tour for Nebraskans—The third annual endurance run for the World-Herald trophies will be held September 6-9. As last year, this run is under the auspices of the Omaha Motor Club, and will be conducted with the sanction and under the rules of the American Automobile Association. This year the route is longer than previously, it being a 4-day run. But the whole tour this year is in Nebraska. The trip out is to be a dedicatory run over the newly improved North Platte route. It is at this time that



YOUNGSTERS HAVE RACING FEVER

The national stock chassis road races being at Elgin, Ill., the youngsters of that town have the speed fever and have built miniatures of the real cars which they use in contests of their own. These events generally are run down-hill, for the miniature cars possess no motive power. A race was run last week and was won by Lawrence Lennarts in a Marmon, with Melvin Miller in a Locomobile second.

Four Winds



FORD IN FOREIGN COMPETITION

The recent Mont Ventoux climb in France gave an American car an opportunity to demonstrate its stamina. A little Ford distinguished itself by making the climb in time that was second only to that of a French six of 100 horsepower

judges will decide which county and which township has the best stretch of road on this route, and award the \$500 and \$300 prizes respectively. The money was raised by the World-Herald and others to boost this route this year.

Detroit Show Dates Set—The week of January 22 has been selected as the date for the annual show of the Detroit Automobile Dealers' Association. Though no formal announcement has been made, it is probable that the show will again be held in the inadequate Wayne gardens. This condition last year led to a secession of representatives of forty-five manufacturers, who held a separate and competing show at the factory of the Regal company. In all probability those crowded out of the garden will take some similar action this year, as their show, as well as the D. A. D. A. exhibition, was a great success.

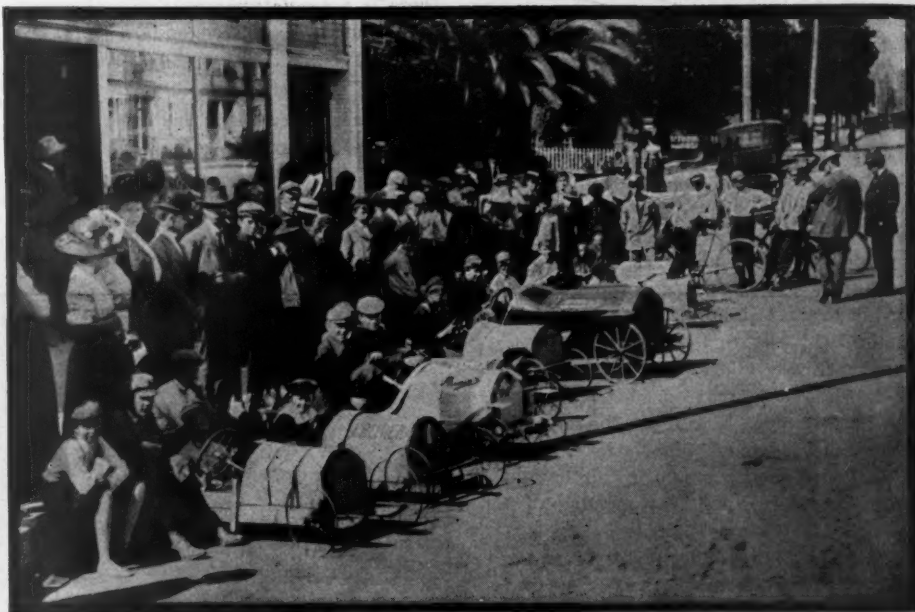
Marylanders Tag Roads—The roads between Baltimore and Annapolis, the state capital, have all been posted with signs, under the auspices of the Automobile Club of Maryland. This work has been supervised personally by the club's secretary, H. M. Luzius. This distance thus posted is over 29 miles. Secretary Luzius also reports that about 8 miles of this road, which is over the state highway, has been newly laid and is in excellent condition for motorists. Through the courtesy of the Mar-Del Mobile Co., a Packard delivery wagon was used for carrying the signs, posts, tools, workers, etc. To carry out resolutions passed at a recent meeting of the Automobile Club of Maryland all roads leading into Baltimore within

a radius of 10 miles will be posted just as quickly as is possible. These roads include the Frederick, Hagerstown, Washington and York roads.

New Roads Planned—Plans for the improvement of more than 100 miles of roadway in Kent county, Michigan, are progressing rapidly under the direction of County Supervisor Williams and the levels on all the through roads have been finished. The work of surveying the

cross roads will be taken up at once. The task allotted to Mr. Williams is a large one and it is expected it will be several weeks before the charts are completed, showing the present level and those that are to obtain when the roads are improved. The new roads as planned will have 12 feet of gravel in the center, with 6 additional feet of roadway on each side, to the small gutters to be constructed along either side for the purpose of properly draining the roads.

Organize in Nebraska—The Platte Valley Transcontinental Good Roads Association was officially organized last week, when 150 delegates from towns between Sedgwick, Colo., and Central City, Neb., attended the meeting at North Platte. Up to this time there had been no definite organization, but following the trip of the World-Herald good roads special over this route, when this organization was urged, invitations were sent out for the meeting. All the counties through which the road passes are members of the association, and each is allowed two delegates. It was decided to mark the posts between Fremont and Denver with a white band, with a yellow and black border at top and bottom. The following officers were elected: President, C. E. Oehler, Kearney; vice-president, W. H. McDonald, North Platte; secretary, D. D. Parker, Julesburg, Colo., and treasurer, W. P. Byron, Gothenburg, Neb. The board of managers consists of men from seven of the counties through which the road passes. This is the route commonly known as the North Platte route, running from Omaha to Denver. Although the organization has just been formed, the road has been greatly improved almost throughout its entire length this summer.



ENCOURAGING THE BOYS

Out in Los Angeles, Cal., an enterprising dealer recently saw a chance to secure good advertising by promoting a race for the boys of the neighborhood. He offered a prize and the youngsters immediately swallowed the bait. They produced miniature cars and took part in an exciting event, the motive power being furnished by other boys who pushed from behind.



PACKARD 3-TON DUMPING TRUCK FOR THE TRANSPORTATION OF ORE IN A WESTERN STATE

THE Packard truck family is growing.

Up to the present the factory output has been confined to the production of 3-ton trucks, but from this date on there will be what might be termed a younger brother, namely, a $1\frac{1}{2}$ -ton truck, which has been brought out in response to demands by owners of the Packard 3-ton truck for one of smaller carrying capacity. It is designed to give higher speeds than the 3-ton one, and as such is fitted with either solid or pneumatic tires. The solid tire sizes are 34 by 3.5 inches all around, with duals in the rear. When pneumatics are ordered the sizes are 38 by 5.5 inches. With the solid tires the speed is 15 miles per hour and it is 17 miles with the pneumatics.

In order to give a latitude in the nature of load carried and so adapt the truck to the carrying of light and heavy freight, it is built with two lengths of wheelbase, one 10 feet and the other 12 feet. On the 10-foot wheelbase the minimum body length is 8 feet 3 inches, the standard length 9 feet 3 inches, and the maximum 10 feet 3 inches. This is the length from the back of the seat to the rear end of the frame. On the 12-foot wheelbase the lengths are: Minimum, 10 feet 3 inches; standard, 12 feet, and maximum, 14 feet.

In practically all respects this truck is a duplicate in design of the 3-ton Packards, with parts larger. The four-cylinder motor, 41-16-inch bore and $5\frac{1}{8}$ -inch stroke, is rated at 18 horsepower at 650 revolutions per minute, and its S. A. E. rating at a piston speed of 1,000 feet per minute is 26.4 horsepower. The four-cylinder motor is mounted under a forward bonnet; the gearset is located amidship; and final drive is by side chains. The motor and clutch are so mounted that by removing the radiator and front bumpers and detaching the intervening connections, the complete unit power plant may be taken out from the front without

hoisting. Further, in the matter of accessibility is the quickness with which both hand and foot brakes may be removed for the purpose of replacement. Provisions are made for lubricating all working parts, including spring boots.

A standard control feature is used, including a sealed automatic governor on the motor for regulating the throttles. In addition, there is throttle control on the steering wheel as well as an accelerator pedal. The steering pillar is on the right, with emergency brake and change-speed lever also on the right.

The standard body is a gate type with a double removable slatted gate on each side. There is a single removable slatted gate in front and rear. The standard gate is 2 feet high, but an option on a 3-foot gate is given.

The Packard company has built some special types of dumping bodies, one of which,

illustrated on these pages, has been in constant use in the transportation of ore in a western state. The body, carried on the 3-ton chassis, is wood, lined with sheet iron. The body is 12 feet long, 6 feet wide and 12 inches deep. The hinged tailgate has a separate opening 14 inches square in which are two collapsible doors opening outward. The truck transports 80,000 pounds of ore daily over a trip of $1\frac{1}{2}$ miles.

1912 RAPID 3-TON TRUCK

For the remainder of this season and for next year's market the Rapid company has brought out a 3-ton truck of the four-cylinder four-cycle design with the motor located under the floor boards and also under the seat and with right-hand control. The loading space back of the seat is 11 feet 6 inches long, with an overhang back of the axle. The wheelbase is 135 inches and the tread 66.75 inches.

One of the exclusive features in the truck



RAPID 3-TON TRUCK WITH MANY 1912 IMPROVEMENTS

is found in the construction of the foot brake, which is located on the ends of the jackshaft. By using a positive cam action instead of a toggle arrangement the maximum braking power is obtained. Emergency brakes are internal, expanding-ring type, wide face and large diameter, operated by lever at right of driver. Either of these brakes are capable of sliding the wheels with a full load plus the 25 per cent overload.

In the construction of the brake, the governor, the two universal joints on a practically straight-line drive, the universal bearings on jackshaft ends of radius rods which are concentric with the shafts and their housings, are some of the important features of this truck.

The governor automatically controls the engine's speed. It is set at the speed at which the truck is intended to be run before leaving the factory, and while it can be adjusted if necessary, it is so placed and sealed that reckless drivers cannot tamper with it.

Lubrication is effected by a gear-driven oiler with separate leads to each cylinder and the main engine bearings; return pump for surplus oil, which precludes the possibility of flooding the engine, thereby carbonizing cylinders and valves. This is a double lubrication system, which is positive at all times.

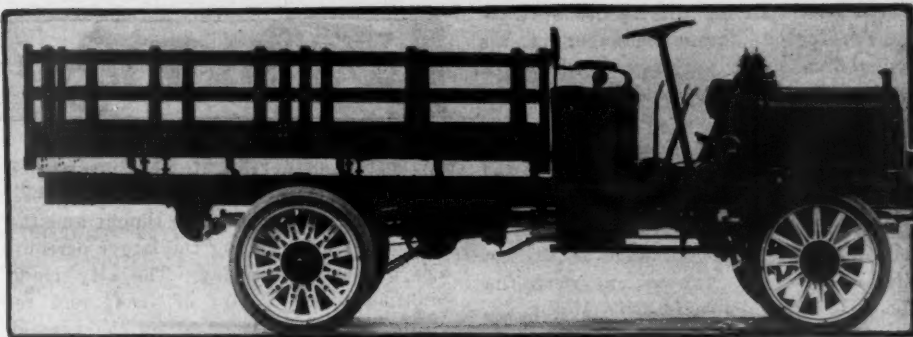
Dual ignition is obtained by high-tension Bosch magneto, with storage battery for starting the motor. The entire system is located on the left side of motor.

The radiator is the flat vertical tube design of 12-gallon capacity, and is suspended on either side on spiral springs which absorb road shocks and greatly increase its serviceability.

Five-inch rolled steel channel is used in the frame, which is hot riveted.

MONTREAL WON OVER

The board of control of the city of Montreal had under consideration the question of introducing into the fire department motor-driven fire appliances,



PACKARD 1 1/2-TON TRUCK, INTENDED FOR SPEEDY LIGHT SERVICE

and after a long discussion decided to move with the larger cities similarly placed to Montreal, by recommending the purchase of motor appliances. This will include an aerial ladder, a fire engine of 1,200 gallons capacity and a hose wagon with 2,000 feet of 2 1/2-inch hose. In addition to the motor fire apparatus, the board of control recommended the purchase of a combined engine and hose carrier, the engine of which will have a capacity of 1,000 gallons and carry 1,000 feet of hose; also a new fire engine of 1,000 gallons, and another of 800 gallons. Tenders are now being received.

GENERAL MOTORS' TRUCK BUSINESS

The General Motors Co. makes an announcement that a selling and service company, under the name General Motors Truck Co., has been formed to market its entire product of commercial cars. The formation of this separate company has been effected for the purpose of concentrating the efforts of the manufacturing and the selling ends of the business on their respective lines.

A line of commercial cars comprehensive enough to cover every business requirement will eventually be made. The nucleus of this line will be formed by the Rapid—which is built with capacities of 1/2 to 3 tons, and the Reliance, with capacities of 4 to 7 1/2 tons. The former selling agencies handling the Rapid and Reliance

trucks will be continued. The Rapid-Reliance Motor Co. of Illinois, 381-387 Wabash avenue, will handle the business in Chicago.

BUSES FOR MEXICANS

A company headed by Dr. Samuel Espinosa de los Monteros, of Mexico City, has been granted a concession by the government to put into operation in that city a number of double-deck motor buses and horse-drawn stages, as a means of relieving to some extent the transportation difficulties in Mexico City. The concession requires that not fewer than ten vehicles be used at the start. It is stated that the company intends to commence with four motor buses and six horse-drawn stages.

It is the intention of the company to gradually extend its system of transportation over all parts of the city and to have lines to the neighboring suburbs and to Toluca-Cuernavaca and Puebla. The first lines will run from Colonia Guerrero to Colonia Juarez and connect the various railway stations and it is promised to have them in operation within a few months.

Cars of about 30 horsepower will be put in operation on the city routes. The coaches will have covered seats on the roof and will accommodate thirty-eight passengers each. The fare will be 5 cents for inside seats and 3 cents for seats on the roof.

The establishment of the coach lines is awaited with much interest.



FLEET OF CROXTON MOTOR DELIVERY VANS BROUGHT OUT EXPRESSLY FOR THE CLEVELAND MAIL SERVICE

PARDINGTON in Oil Business—A. R. Pardington, former manager of the Long Island motor parkway, has accepted the presidency of the Consolidated Lubricants Co.

Mitchell Managers Meet—Orders for more than 4,500 Mitchell cars were placed at the annual convention of Mitchell branch sales managers from all parts of the United States and Canada at Racine, Wis., last week. The sellers were the guests of the Mitchell-Lewis Motor Co. for 3 days to look over and study the 1912 issue.

Ohioans Demand Show—At the insistent demand of many Ohio farmers Secretary A. P. Sandles, of the state board of agriculture, will put on exhibition a full line of motor cars at the Ohio state fair this fall. Exhibitors will have a demonstration track on the grounds. Car manufacturers already have overrun the building set apart for their use and a large overflow will be taken care of. Another feature of the fair will be a national good roads exhibit, put on by the bureau of highways of the department of agriculture.

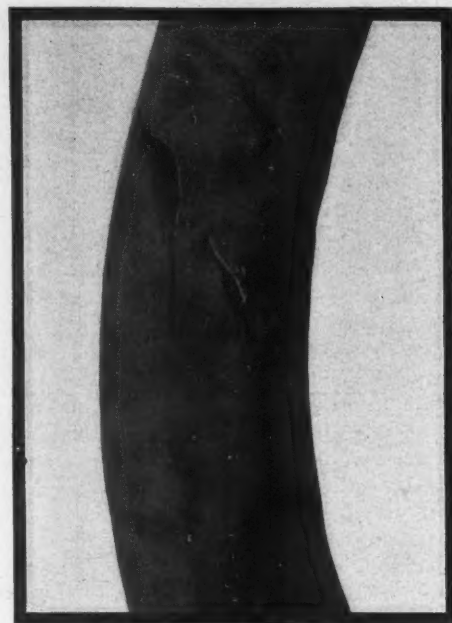
Business in Fond du Lac—A resume of conditions in the motor car field of Fond du Lac, Wis., discloses facts that are regarded as typical of similar cities in Wisconsin. Local sales agents sold approximately 165 cars from January 1 to August 15. Of this number thirty-nine cars were purchased by residents of Fond du Lac, about fifty were sold to farmers and the remainder in a small territory surrounding Fond du Lac. The average price of the cars was \$1,250, which is about 20 per cent lower than the average for the preceding year, and indicates the trend of the trade at this time. There also is a change of the base of the market. For-

Among the Makers

merly the agent sought city buyers and did not attempt to interest the farmers. Today the farmers are the sought and the seeking and are taking the larger percentage of the total sales. The city trade practically takes care of itself and requires no particular effort on the part of the agent. Fond du Lac is a city of 17,000 population.

Donahue Joins Clark—J. C. Donahue, formerly of the Donahue Motor Sales Agency, of Pittsburgh, has just assumed the position of general manager of the Clark Motor Car Co., of Shelbyville, Ind. Mr. Donahue for the past year has been handling the Clark car in the Pittsburgh territory and thus is fully conversant with its construction.

Taps for the Garden—While no definite announcement has been made as yet of the decorative plans for the New York show, it is said by those in charge that it will surpass anything ever before attempted for any exhibition held in Madison Square garden or anywhere in this country. The reason for this is that the forthcoming exhibition, which will run from January 6 to 20, will not only be the last motor show in the famous structure, but it will be positively the last show to be held in the garden. It is, therefore, fitting that the farewell exhibition be given a gorgeous display to give old patrons a spectacle which will be cherished by them in memory of the building which has housed nationally famous functions and which is now to be torn down to make way for an office building. Contracts for



STUDYING TIRE ABUSE

The B. F. Goodrich Co. of Akron believes that by far the greater part of tire accidents are due to neglected repairs. Frequently this is the case when the user thinks he has given the tire the most careful treatment possible. In view of this fact, the Goodrich company is doing everything in its power to educate tire users to a more perfect understanding of the causes of tire trouble, and is sending out a series of folders illustrating the results of the more common mistakes in the treatment of tires. The tire shown in the accompanying illustration is an example of an accident that might have been easily prevented. The tire originally

the decorative construction work, which mainly will consist of steel, like that of the last show, are now being given out. Work in other lines is progressing rapidly. The drawing for exhibition space for the forthcoming show, at which the oldest and best known manufacturers are to display their products, will take place some time in September.

Firestone a Good Samaritan—A water famine was averted at Akron, O., last week, and the entire city supplied during an interim of several days while the municipal water plant was out of order, by connecting the city mains up with the private plant of the Firestone Rubber Co., manufacturer of tires. H. S. Firestone, hearing of the city's difficulty, volunteered the relief.

Rambler's Extensive Plans—Charles T. Jeffery, president of the Thomas B. Jeffery Co., Kenosha, Wis., has announced plans for the erection of large Rambler service buildings and the establishment of a most complete sales and service system for the largest cities of the country. The New York service building will be located on Broadway; the Boston house on Commonwealth avenue; Chicago, Michigan avenue; San Francisco, Mission and Geary streets. While the Rambler announcement for 1912



NEW HOME OF THE FRANKLIN IN CINCINNATI

and Dealers



EXAMPLE OF INEXPERIENCE

had a small cut entirely through the tread. An inside patch was applied by the owner, he feeling that this was all that was required to place the tire in good running order. But instead, the inside patch merely aggravated matters, and acting as a wedge caused the tire more harm than good. The result, as shown, was that the tire blew out from bead to bead; that is, the inner patch wedged the fabric apart, causing it to break or pull apart from bead to bead. By looking closely one can see how the patch has been forced through the break, truding on the outside and making the repair useless.

has not yet been issued, something unusual is promised, as during the last 12 months some of the best engineering talent in the country has been added to the Rambler forces. Among these are George Braithwaite, formerly factory manager for the Stevens-Duryea Co.; Robert Jardine, of national reputation, and F. C. Mock, formerly assistant engineer of the Stoddard-Dayton. The Rambler proposes inaugurating in a most vigorous policy in 1912.

Oklahomans Talk Show—Dealers of Oklahoma City are co-operating with W. T. Yoder, owner of the Auditorium, for the purpose of holding a motor car show in Oklahoma City in October, immediately following the state fair, which will be concluded October 7. Extensive reservations of space have been made in the motor car building in the fair grounds and dealers believe that the time will be opportune for holding the show while the exhibits can be held in this city. As the state fair will be visited by about 200,000 farmers, the makers of motor cars are confident that many of those farmers will be interested in purchasing motor cars as the agricultural conditions of the state are favorable for this line. Most of the agencies that cover Oklahoma territory

make their headquarters in Oklahoma City, the capital.

Williams Joining King—George Williams, superintendent of the motor department of the J. I. Case Threshing Machine Co., Racine, Wis., whose resignation was announced a short time ago, will on September 1 become factory manager of the King Motor Co., of Detroit, in which he holds an interest. On leaving Racine Mr. Williams was tendered a banquet by the foremen and employees.

Overland Outings—The new club house of the Willys-Overland employees, located at Bay Shore, Toledo, is furnishing much diversion this summer. One of the latest functions was a dance given by the girls from the top and trim departments. The Overland band furnished music for the dancers. About forty young women employed at the plant attended. Twenty-five chickens cooked by the girls themselves were served.

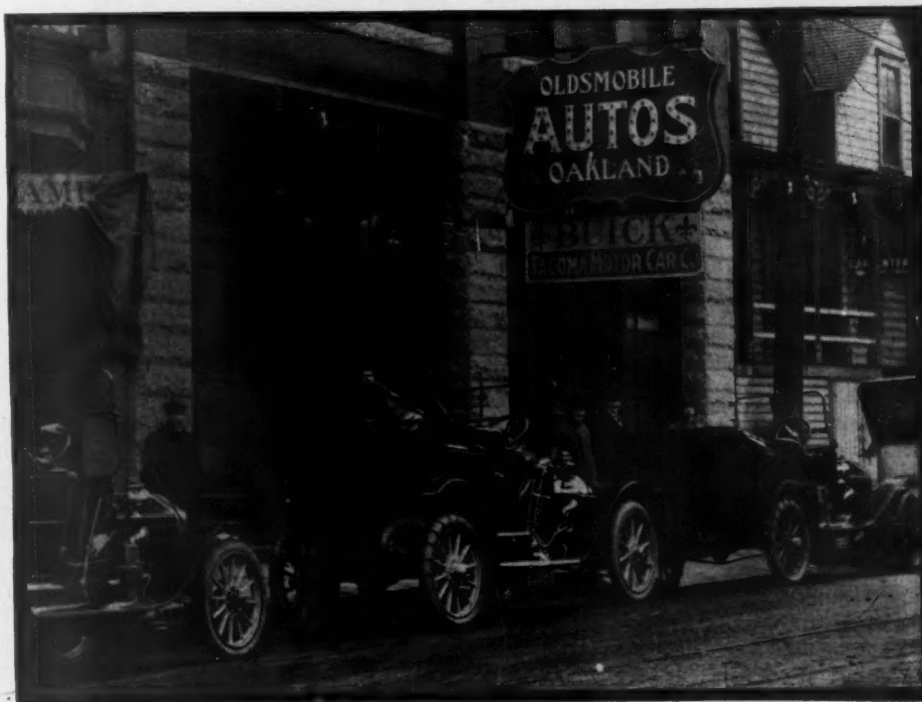
Extending Kissel Plant—Work on the addition to the works of the Kissel Motor Car Co., of Hartford, Wis., has been started. The building will have dimensions of 107 by 200 feet and will be three stories high, with 12 and 14-foot ceilings, of solid brick construction. Contracts have also been awarded for the construction of an addition to the machine shop, to be 50 by 112 feet in size. It is hoped to have both structures ready by November 15 or December 1, as the big Kissel works are now cramped for room and the enlargement of the output

for 1912 makes more manufacturing space essential.

Big Order for Tires—The Chanslor & Lyon Co., of San Francisco, has taken the agency for the Kelly-Racine tire, made by the Kelly-Racine Rubber Co., of Racine, Wis. In taking this agency, the Chanslor & Lyon Co. placed one of the largest single orders in the history of the rubber industry. Ten thousand casings and 20,000 tubes were ordered to be shipped as early as possible. This represents almost half a million dollars in rubber tires. These tires will be distributed among the six Chanslor & Lyon branches.

Have a New Idea—W. R. Link and Fred Hicks, of Grand Rapids, Mich., are promoters of a new industry, the purpose of which will be the refinishing of motor cars. Mr. Hicks at present is connected with the Adams & Hart Co. in the capacity of contractor for the refinishing business and he is an experienced work-business. He will manage the factory end of the business and Mr. Link will have charge of the office. The company will be incorporated for about \$30,000, it is expected.

Will Reopen Bids—Milwaukee dealers are up in arms over the fact that the socialist county administration is shutting out competition in purchasing motor cars for public uses. During the last week bids were received for furnishing an ambulance for the coroner's office. Only one bid was sent. Upon investigation occasioned by the absence of other bids it was found that the specifications issued by the county would fit but one car in the world. The county will probably re-advertise for bids under specifications that are not closed, but will permit of actual competition.



NEW GARAGE OF TACOMA MOTOR CAR CO., TACOMA, WASH.



GOODYEAR BRANCH IN COLUMBUS, OHIO

Brief Business Announcements

POMONA, CAL.—The Pomona Rubber and Auto Supply Co. has recently opened, with W. H. Buswell manager.

San Francisco, Cal.—The Pioneer Automobile Co. has secured the agency for the Commer trucks and the Guy Vaughan pleasure cars.

Detroit, Mich.—The Ross Heaton Mfg. Co., of Richmond, Va., making motor car top fasteners, has moved to Detroit and will occupy part of the factory building at Beaubien and Fort streets.

Cleveland, O.—W. F. Melhuish is now connected with the White Motor Car Co., having charge of its taxicab sales department. Mr. Melhuish, until recently, was sales manager of the Croxton-Keeton Co.

Chicago—The Overland agency has reverted to the Overland Motor Co., of which Charles W. Price is manager, the Furner Motor Car Co. having retired from the field. Mr. Price will continue as Overland wholesaler in this district.

Detroit, Mich.—Robert C. Winlo, formerly assistant purchasing agent of the Packard Motor Car Co., has accepted and is now occupying the position of general purchasing agent of the Grabowsky Power Wagon Co., Detroit.

Palo Alto, Cal.—Knight Starr Jordan, son of David Starr Jordan, one of California's millionaires, has launched into the motor car business, having recently purchased a garage at Palo Alto. Young Jordan graduated from Stanford uni-

versity last spring as a mining engineer, but decided to enter the motor car business.

Cincinnati, O.—The Marshall-Clark but decided to enter the motor car business to the Clark Motor Car Co.

Chicago—C. M. Kolbenstetter, who has for a number of years handled cars and carbureters throughout the central states, is now a part of the Stromberg selling organization.

Toledo, O.—The Ohio Motor Sales Co., of Toledo, has closed a deal for the local agency of the Reo car, which will be handled at 1115 Madison avenue. W. H. Aldrich and E. F. Blue are at the head of the concern.

Beloit, Wis.—J. H. Saris, agent for the Ford in Beloit and surrounding territory, has leased the former Broadway skating ring building and will remodel it for garage and salesroom purposes. The building is 130 by 49 feet in size.

Toledo, O.—Announcement is made that L. E. Barger, formerly associated with H. H. Dennis in the Rambler Motor Sales Co., of Toledo, has opened rooms at 623-625 Madison avenue, where he will handle the Abbott-Detroit for northwestern Ohio.

Toledo, O.—The new home of the Roberts Toledo Auto Co. is rapidly nearing completion, and will be ready for occupancy early in the fall. It is located at the corner of Madison and Eleventh streets, Toledo, and will face 60 feet on motor row. The first floor will be used

as a display and sales room and the second floor for repairs. A modern freight elevator will be installed.

San Francisco, Cal.—The Hercules Auto Starter Co. has commenced manufacturing its new self-starter in San Francisco.

Atlanta, Ga.—The Primo Motor Car Co., of Atlanta, went into bankruptcy last week. No meeting of creditors has been held yet and no receiver appointed.

Monroe, Mich.—The Monroe Garage Co. is promoted by County Treasurer Ed. L. Cousine, Boyes and Benjamin Dansard, president and cashier of the Dansard bank. It will be located at the New-comer lot.

New York, N. Y.—John Van Benschoten, one of the largest dealers along the Hudson river, will handle the agency of the Mais motor trucks in Dutchess, Ulster and Columbia counties, with headquarters at Poughkeepsie.

Sheboygan, Wis.—The Erie garage, North Ninth street, owned and conducted by H. E. Smith, has been purchased by Harry Black and I. E. Clarenbach. Extensive improvements will be made. The Erie garage was the first in Sheboygan.

Portsmouth, O.—John Aigeldinger, a vulcanizer, who has been associated with the Friel garage, and R. N. Russell have organized a partnership to operate a garage and repair shop in the room formerly occupied by the Patterson garage on West Second street.

Milwaukee, Wis.—The Kopmeier Motor Car Co., 375-389 Summitt avenue, Milwaukee, Wis., has closed a contract for exclusive representation in the state of Wisconsin for 3 years of the Fiat car. The Kopmeier company is distributor of the Chalmers and Detroit electric.

Trenton, N. J.—The Auto and Marine Specialty Co., incorporated, with offices in the Broad-State Building, was organized for the purpose of manufacturing and marketing novelties, wares and general merchandise, especially patented motor appliances. The capital is \$50,000, divided into 500 shares at \$10 each.

New York—Shampon & Shampon are preparing plans for extensively altering the Douglas stables, at 165 and 167 Clymer street, Brooklyn, to convert the building into a modern garage, which will be the largest building of its kind in that section of the borough. The property is owned by the Williamsburg Bridge Garage Co.

Nashville, Tenn.—The Hager-Elliott Engineering Co. has opened a new garage at 602 McGavock street in addition to the large repair shop it has been operating for about 2 years. The new building is a \$15,000 garage and has 24,000 feet of floor space. The construction is of white brick. The office and show rooms are finished in Flemish oak, and every convenience has been installed. Its agencies consist of the Peerless, Velie, Empire and

Paige-Detroit. A. F. Parkes, formerly sales manager of the Chester Motor Car Co., is now sales manager for the concern.

Columbia, S. C.—The Cartercar Distributing Co. has opened a show room in Spartanburg, 161 North Church street, in the theater block.

Los Angeles, Cal.—Fred Myers has taken over the entire business of the Sunset Auto Co., of Los Angeles. Besides the Havers six, he has the agency for the Cass truck.

Oconto, Wis.—Frank Smith and H. N. Bradley have formed a partnership and will build a garage and repair shop on Superior street. Mr. Bradley formerly conducted a garage.

Minneapolis, Minn.—The northwestern territory for the Oliver truck has been taken by the Motor Car Repair and Equipment Co., 206, 208 and 210 Washington avenue north, Minneapolis.

Seattle, Wash.—The Arthur Bunker Motor Car Co., Seattle, has broken ground for a new two-story garage, which it expects to complete by October 1. This concern is northwestern distributor for Marmon, Abbott-Detroit and Oakland cars.

Washington, D. C.—The Marion Sales Co., Inc., will be the name of a new firm in Washington of which Henry Cunningham, formerly connected with one of the local agencies as salesman, will be the manager. The Marion and American cars will be handled by this firm.

Richmond, Ind.—A. K. McCluney has resigned his position with the Buick Motor Co., and has engaged with the Westcott Motor Car Co. Mr. McCluney will control the district comprising Michigan, northern Indiana and northern Ohio, as special district representative of the Westcott company.

Oshkosh, Wis.—The Crane Taxicab Co.'s building at Fifth and Wisconsin streets was badly damaged by a wind and rain storm. Preparations had been made for a large addition and the excavations weakened one of the side walls. A new structure will now be erected on the same site.

St. Louis, Mo.—The Brooks-Latta Co., which now has an experimental plant at 4255 Fairfax avenue, has secured an option on a lot with a frontage of 200 feet at Sullivan and Lambdin avenues, on which it is planned to build a factory for the manufacture of motor cars and delivery wagons.

Milwaukee, Wis.—The Garage Equipment Mfg. Co., of Milwaukee, Wis., announces that it has secured the services of A. S. Glucker and C. L. Hixson to represent its line of accessories. Mr. Glucker will have charge of the eastern territory, making his headquarters in New York city, where he will open an office after October 1. Mr. Hixson will have charge of the territory west of Chi-



BRANCH OF DIAMOND RUBBER CO. IN COLUMBUS, OHIO

Recent Motor Incorporations

Indianapolis, Ind.—Fashion Garage and Auto Co., capital stock \$10,000; incorporators, B. D. Gilson, W. L. Higgins and J. L. Edwards.

Portland, Me.—Wyeth Motor Car Co., capital stock \$600,000; to manufacture, build and sell motor vehicles, etc.; president, C. E. Clemence; treasurer, E. Perry.

Pittsburgh, Pa.—Mutual Windshield Mfg. Co., capital stock \$12,000; to manufacture, repair and deal in motors, motor vehicles, etc.; incorporators, Arant J. Kraber, George F. Ferrier and Lloyd E. Poffinberger.

Kittanning, Pa.—Kittanning Motor and Traffic Co., capital stock \$5,000; to deal in motor cars, machinery, etc.; incorporators, M. S. Jack, C. A. Shaffer and J. S. Claypoole.

New York.—Automatic Fender Co. of America, capital stock \$1,000,000; to manufacture fenders, for motor cars, engines, etc.; incorporators, W. E. McGuirk, S. S. Myers and W. W. Lowther.

Toledo, O.—Electric Auto-Lite Co., capital stock \$100,000; incorporators, Claud L. Lewis, Sherman L. Kelly, J. A. Barber, O. M. Haynes and P. D. Zieger.

Trenton, N. J.—Auto and Marine Specialty Co., capital stock \$50,000; to manufacture cranks; incorporators, Charles T. Williams, Jr., H. S. Maddock, Jr., and Frank D. Holmes.

New York.—Automobile Construction Co., capital stock \$27,000; foundry and wood-working establishment; incorporators, A. T. Graham, H. M. Wells and W. E. Fuller.

New York.—Simplex Auto Cranker Co., capital stock \$100,000; to manufacture motor cars, supplies, etc.; incorporators, E. A. Gardner, I. F. Halton and W. Patrick.

Indianapolis, Ind.—Fisher-Gibson Co., capital stock \$50,000; to deal in motor cars and accessories; incorporator, Carl G. Fisher.

Jersey City, N. J.—Studebaker Corporation of America, capital stock \$100,000; to manufacture motor cars, etc.; incorporators, H. G. Latimer, J. B. Marsh and J. R. Turner.

Jersey City, N. J.—Cartercar Sales Co., capital stock \$10,000; to manufacture motor cars, etc.; incorporators, B. S. Mantz, H. A. Black and John R. Turner.

Jersey City, N. J.—Oakland Motor Sales Co., capital stock \$10,000; to manufacture motor vehicles, etc.; incorporators, B. S. Mantz, H. A. Black and John R. Turner.

Jersey City, N. J.—Eastside Auto Repair Co., capital stock \$20,000; to construct and repair vehicles, etc.; incorporators, Vernon Ettinger, Matthew Weinstein and Chester C. Beggs.

Newark, N. J.—Ignition Mfg. Co., capital stock \$100,000; to manufacture motor cars, supplies, etc.; incorporators, P. G. Roder, A. Markowsky and W. L. Roder.

New York.—Rex Sales Co., capital stock \$10,000; to manufacture and deal in electrical machinery, etc.; incorporators, John G. Hogan, Alexander J. Patton and James O. Hill.

Albany, N. Y.—White Automobile Sales Co., capital stock \$10,000; to deal in motor cars, etc.; incorporators, Wm. D. J. Wright, Edward Ambrose and John H. LaFleur.

New York.—Regal Sales Co., capital stock \$10,000; to manufacture and deal in motor cars; incorporators, Louis H. Moose, Leopold O. Rothschild and Alfred B. Nathan.

New York.—Hudson Valley Automobile Co., capital stock \$10,000; to manufacture motor cars, supplies, etc.; incorporators, G. Eickemeyer, Alfred M. Keene and Harry L. Twine.

Columbus, O.—E. A. Wick Rubber Co., capital stock \$3,000; agency for tires and rubber articles; incorporators, Eldridge Wick, Dudley B. Kennedy, Curtis A. Manchester, Leroy A. Manchester and Agnes G. Hamilton.

Toledo, O.—Electric Auto-Lite Co.; capital, \$100,000; to manufacture and sell electrical and mechanical apparatus, including a patented electric motor car light; incorporators, Claude L. Lewis, Sherman L. Kelly, J. A. Barber, O. M. Haynes and P. F. Zeigen.

cago and east of the Rocky mountains, with headquarters in Chicago. His office will be opened about February 1.

Columbus, O.—The announcement is made that the Eastern Automobile Co., recently incorporated with a capital of

\$20,000, has taken over the garage and repair shop formerly operated by the L. & E. Garage & Sales Co. at 60-62 East Spring street. J. Goldstein is president; J. E. Leacy, secretary, and F. F. Cain, general manager of the new corporation.

The Motor Car Repair Shop

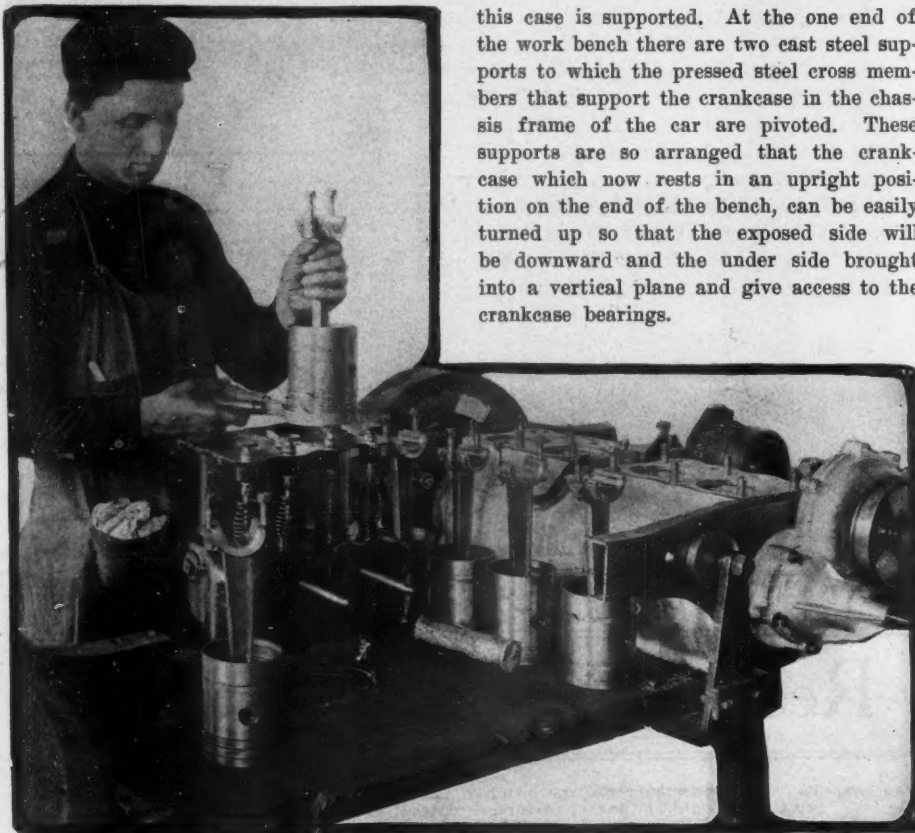


FIG. 1—CONVENIENT FACILITIES PROVIDED FOR ASSEMBLING E-M-F MOTORS

BY those who have had their fingers cut and pinched while trying to squeeze the rings into the slots in the piston, because a fellow worker happened to let the heavy cylinder casting slip down too far onto the piston, the ease and convenience of the operation shown in Fig. 1 no doubt will be appreciated.

The operator is provided with a special tool, which he is holding in his right hand, that enables him to squeeze the piston rings together with the utmost ease and with only one hand. This tool is a very simple one, consisting merely of a band of iron about 3-16 inch thick and 1 inch wide, bent in circular form, with its prolonged ends at right angles to form an operative handle. The diameter of the circular part is normally about $\frac{1}{4}$ inch larger than that of the piston, but when the handle ends are drawn almost together, the circular portion grips the piston and conforms to its shape very closely. The prolonged straight ends have a half of a screwdriver or file handle secured to each portion to afford a comfortable grip. The illustration shows the ease with which the pistons are fitted into the cylinders preparatory to the assembly of the cylinders onto the crankcase to the left of the operator.

In connection with the crankcase to the left of the operator, attention is called to the simple but convenient means by which

this case is supported. At the one end of the work bench there are two cast steel supports to which the pressed steel cross members that support the crankcase in the chassis frame of the car are pivoted. These supports are so arranged that the crankcase which now rests in an upright position on the end of the bench, can be easily turned up so that the exposed side will be downward and the under side brought into a vertical plane and give access to the crankcase bearings.

readily lay the motor on its side or bring it to rest in an upright position.

In Fig. 2 is shown a simple but effective means for supporting the motor crankshaft while its main or connecting rod bearings are being fitted to it. Two substantial cast steel standards securely fastened to the bench are arranged so that the crankshaft may be rested therein and rotatably secured, and there also is a means whereby the shaft may be held rigid by simply sliding it to one side. The bearings in the tops of the standards are provided with hinged caps which may be locked by a single turn of a thumb nut.

The crankshaft has an integral flange to which the flywheel is bolted; and there is a little stub shaft or pin about 3-4 inch long on the inside of the standards which is arranged to register with the bolt holes in the flywheel flange. Thus, when the workman desires to hold the crankshaft against rotation, he has but to press the shaft sidewise toward the flanged end and at the same time turn it slowly, and as the pin or stub shaft registers with one of the bolt holes in the flange, the shaft will slip sidewise and the stub shaft or pin will engage the bolt hole in the flange, holding it against rotation.

In this latter illustration the workman is fitting one of the end bearings onto the crankshaft. The crankshaft belongs to an E-M-F motor in which the rear end bearing is supported in a removable end plate. A special tool is being employed to fit these bearings, which greatly facilitates the work. Arrangements of this sort are found in many factories and can be used in repairs.

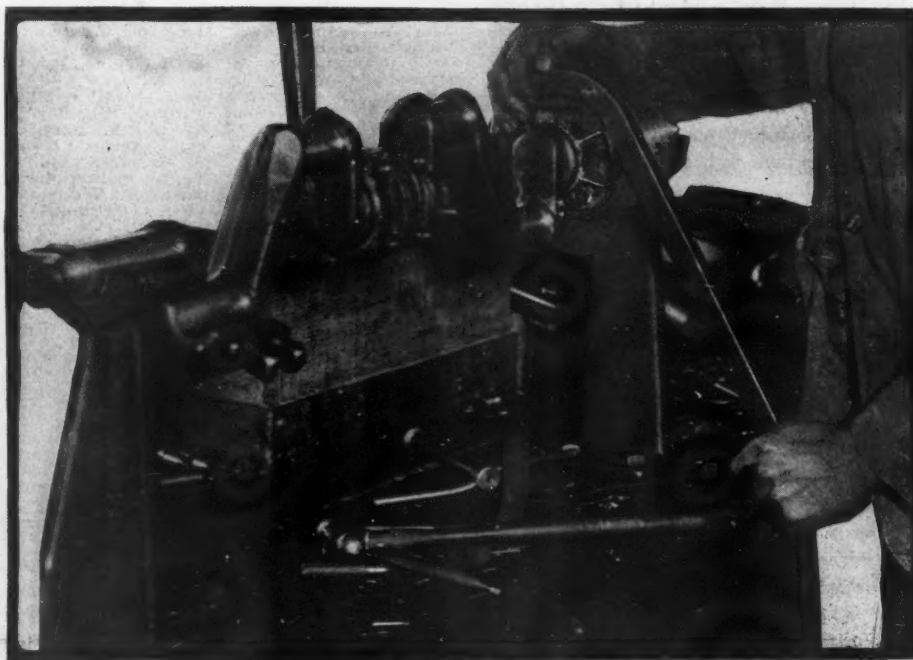


FIG. 2—SHOWING FACILITIES AT E-M-F PLANT FOR SUPPORTING CRANKSHAFTS